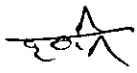
UNIVERSITY OF JORDAN

FACULTY OF GRADUATE STUDIES
GRADUATE DEPARTMENT OF ENGINEERING
MATHEMATICS AND PHYSICAL SCIENCES

DEVELOPMENT OF A NEW MARKET INDEX FOR AMMAN FINANCIAL MARKET USING MONTE CARLO SIMULATION

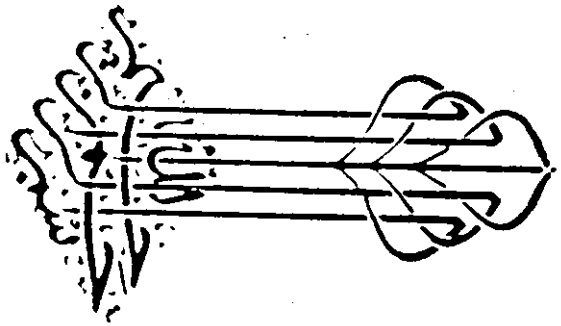
By
Shatha Malhis Kutob

Under the Supervision of
Prof. Arun G. Walvekar



Submitted in partial fulfillment of the requirements for the Degree of Master of Science in Industrial Engineering - Faculty of Graduate Studies - University of Jordan
Amman - Jordan

DECEMBER 1991



Date of thesis presentation: **December 23, 1991**

The examining committee considers this thesis satisfactory and acceptable for the Master of Science Degree in **Industrial Engineering**

Prof. Arun G. Walvekar, Chairman,
Industrial Engineering Department
University of Jordan

Dr. Ghaleb Abbasi, Member,
Industrial Engineering Department
University of Jordan

Dr. Adeeb Haddad, Member,
Executive Director, Central Bank of Jordan
Dean, Institute of Banking Studies

To my beloved husband MAZEN
who brought sunshine into my life

To my dear babies LAYAN and KAZEM
who saw the light with this thesis

To all three
who supported me all the way through

ACKNOWLEDGMENT

I wish to express deep thanks to Prof. Arun G. Walvekar under whose supervision this thesis was carried out, for his dynamic enthusiasm, unsurpassed guidance and advice on all technical and administrative problems throughout this work. Also, I would like to thank Dr. Ghaleb Abbasi, Dr. Adeeb Haddad, my parents and all my family, without whose unlimited generosity in giving help and encouragement this work could not have been accomplished.

TABLE OF CONTENTS

ACKNOWLEDGMENT i

TABLE OF CONTENTS ii

ABSTRACT (in ENGLISH) vii

ABSTRACT (in ARABIC) viii

CHAPTER ONE: INTRODUCTION

1. Stock Exchange..... 2
2. Measures of Performance..... 2
3. Amman Financial Market (AFM)..... 3
4. Amman Financial Price Index (AFPI)..... 6
5. Objective of the Thesis..... 7

CHAPTER TWO:LITERATURE SURVEY

1. Index Form..... 9
2. Index Objectives..... 9
3. Main Types of Indexes..... 10
4. Index Construction..... 11
   - 4.1 The Universe of Stocks Represented by the Indicator 11
     - 4.1.1 Sample Size..... 11
     - 4.1.2 Representativeness..... 12
   - 4.2 The Relative Weight Given to the Stocks..... 12
     - 4.2.1 Value Weighted Index..... 12
     - 4.2.2 Price Weighted Index..... 13
     - 4.2.3 Equally Weighted Index..... 13
       - 4.2.3.1 Equally Weighted Arithmetic

Index..... 13

4.2.3.2 Equally Weighted Geometric Index..... 14

5. Implications for Asset Allocation Strategy..... 15

6. Comparing Indexes..... 16

7. Stock Price Indexes..... 18

7.1 Dow Jones Indexes..... 18

7.2 Standard and Poor's 500 Index..... 19

7.3 The New York Stock Exchange Composite Index..... 21

7.4 The American Stock Exchange Price Level Index..... 22

7.5 Value Line Composite Average..... 24

7.6 Nikkei Average..... 25

7.7 Wilshire 5000 Equity Index..... 25

7.8 NASDAQ - OTC Composite Index..... 26

CHAPTER THREE: TOOLS AND METHODS

1. Simulation..... 27

1.1 Monte Carlo..... 27

2. Statistical Techniques..... 28

2.1 Regression..... 28

2.2 Correlation..... 30

2.3 Coefficient of Determination..... 32

2.4 Averages..... 32

2.5 Populations and Samples..... 33

3. Database Management Systems..... 34

3.1 Hierarchical Databases..... 35

3.2 Basic Concept of a Relational Database File 36

3.3 Data Records 36

3.4 Data Field 36

3.5 Application of a Relational Database 37

CHAPTER FOUR: DATA PREPARATION

1. Collecting Data 39
2. Data Manipulation 40
3. Measuring Data Suitability and Stability 42
4. Remarks Over Data Suitability and Stability.... 43
5. Modification in Data Domain and Duration 45
6. Data Domain and Duration 46

CAHPTER FIVE: MODELING

1. Building the Model 48

1.1 Index Statistical Formulation 48

1.1.1 Value Weighted Index Approach 49

1.1.2 Price Weighted Index Approach 49

1.1.3 Equally Weighted Geometric Index Approach 50

1.1.4 Unweighted Index Approach of Price Movements 51

1.2 The Universe of Stocks Represented 51

1.2.1 Sample Size 51

1.2.2 Representativeness 52

1.3 Monte Carlo Simulation 54

1.4 Adequacy of Index Results 55

1.4.1 Testing Adequacy of Index Results 55

1.4.2 Standards that will be used to Measure Adequacy of Results 56

2. Database Programmes 59

2.1 First Stage 60

2.2 Second Stage 60

2.3 Third Stage 61

CAHPTER SIX : CALCULATIONS AND ANALYSIS

1. Adequacy Tests 63

1.1 The Application of the First Standard 63

1.2 The Application of the Second Standard 66

1.3 The Application of the Third Standard 74

1.4 The Application of the Fourth Standard 77

2. Result 79

3. Amman Financial Market Price Index 83

3.1 Description 83

3.2 Analysing Amman Financial Market Price Index 84

CHAPTER SEVEN : CONCLUSIONS AND RECOMMENDATIONS

1. Conclusions 89

1.1 Calculation Method..... 89
1.2 Sample Size..... 89
1.3 Setting a Certain Structure for Companies..... 90
1.4 Allocation Strategy..... 91
1.5 AFM Sensitivity..... 91
1.6 International Markets..... 92
2. Recommendations..... 92

BIBLIOGRAPHY 95

APPENDIXES

A DESCRIPTION OF THE COMPANIES LISTED IN THE REGULAR AMMAN FINANCIAL MARKET 98
B THE DEVELOPMENT OF COMPANIES' SHARE PRICE AND NUMBER OF SHARES TRADED 113
C RANDOM SELECTION OF THE COMPANIES USING MONTE CARLO SIMULATION 140
D DATABASE PROGRAMMES 144
E CORRELATION COEFFICIENT BETWEEN EACH INDEX AND THE GROUP OF INDEXES DEVELOPED BY THE STUDY.... 180
F STATISTICAL RESULTS..... 197

ABSTRACT

This thesis aims at developing new broad based market indexes for Amman Financial Market which are thoroughly tested for their adequacy with respect to the Amman Financial Market status and conditions.

The thesis starts with a general introduction after which the objective was identified. This was followed by literature survey discussing some widely acknowledged common features of most indexes, with an emphasis on major international stock market performances. Monte Carlo Simulation and several statistical techniques were also discussed due to their strong relation to the probabilistic nature of the study. Detailed daily reports of companies' listed at the Amman Financial Market for five years period (1985-1989) were gathered and manipulated in the adequate manner to reach outcoming balanced data needed to perform the study. The precise forms the indexes may take concerning the method of construction, sample size and representativeness were decided. A model required for practicing different simulations was set up. One hundred sixty index simulation trials and four new forms of Amman Financial Price Index were identified. Developed indicators were subjected to a series of statistical tests using graphical, divergence and correlation analysis to define the extent of their efficiency.

Results of the relative volatility of the various produced indexes in the different forms were as expected, however, results quality and level of fitness were not.

Fox-base (computer data base management systems software) programmes were developed to construct the huge database needed to analyze the outcome accordingly.

ملخص

تهدف هذه الأطروحة الى استحداث مقاييس جديدة لمتابعة تغير أسعار الأسهم في سوق عمان المالي تكون خاضعة لسلسلة من المعايير والاختبارات تضمن سلامة اختيارها ودقة أدائها بما يتناسب وأوضاع سوق عمان المالي.

تبدأ الأطروحة بمقدمة عامة تستعرض بأسلوب مختصر مقاييس متابعة تغير الأسعار يلي ذلك تعريف بسوق عمان المالي والمقياس المستعمل فيه مع بيان الهدف المتوخى من هذه الدراسة.

وللتعرف على الأعمال والأبحاث السابقة المتعلقة بموضوع الأطروحة تم تخصيص فصل اشتمل على استعراض للعوامل التي تؤدي الى استحداث أنسب المقاييس وعلى مجموعة أمثلة عالمية لمقاييس متابعة تغير الأسعار. ونتيجة للطبيعة الاحتمالية لمقاييس متابعة تغير أسعار الأسهم فقد تم استعراض أسلوب مونت كارلو في المحاكاة بالاضافة الى مجموعة معايير احصائية. تم من خلال الأطروحة جمع وتحليل للنشرات اليومية الصادرة عن سوق عمان المالي ولمدة خمس سنوات (١٩٨٥ - ١٩٨٩) بهدف الوصول الى معلومات منقحة ومناسبة تشكل القاعدة الرئيسية لمجريات الدراسة. كما وتم اعتماد أربعة أساليب عامة لاعداد مقاييس متابعة تغير أسعار الأسهم، مع تحديد لحجم العينات المستعملة وطريقة توزيعها على القطاعات. كما تم من خلال الأطروحة تطوير النموذج اللازم لاستحداث مجموعة مقاييس تجريبية باستخدام أسلوب مونت كارلو في المحاكاة حيث تم استحداث ١٦٠ مقياس تجريبي بالاضافة الى أربعة مقاييس تشكل صور جديدة للمقياس المستخدم حاليا في سوق عمان المالي.

وللتأكد من صحة وفعالية المقاييس المستحدثة ولاختيار أفضلها فقد تم اختبارها باستخدام سلسلة معايير احصائية، حيث كان توافق المقاييس المستحدثة وارتباطها مع بعضها متوقعا، في حين أن جودة تلك النتائج لم تكن متوقعة. وللمساعدة في تحليل المعلومات اللازمة لاعداد هذه الدراسة واجراء العمليات الحسابية اللازمة لاختيارها فقد تم عمل مجموعة برامج على الحاسوب باستعمال نظام قاعدة البيانات الترابطي (الفوكس بيس).

CHAPTER ONE

INTRODUCTION

STOCK MARKET is a place for organizing and facilitating trading of common stocks and securities, types of investors participating in those markets vary from individual to professional, and each participant needs to know about the prices, structure and mechanism of the market in which he or she might invest. For many investments, decision lies in the information available with which to make thoughtful trade-offs among alternative.

The amount and quality of information and the investment advice available for investors vary widely, but a steady flow of approved information which the active investor follows closely to obtain a summary of daily prices and market activities are market indexes.

MARKET INDEXES have fascinated economists for decades, this stems from the evidence that the prices of all common stocks are simultaneously and systematically effected by the same basic economic forces, so that they all tend to move up and down together, through alternating bull and bear market periods, thus the market indexes have become through history the instrument used to gauge market performance.

This study is concerned with the attempt of finding a

market index for Amman Financial Market (AFM) using the Monte Carlo Simulation Method.

1. STOCK EXCHANGE

Stock exchanges are elaborate systems that enable investors to acquire or dispose of securities at prices that are "Fair and Equitable", such systems are convenient to those who wish to buy or sell securities. By increasing the investment options available to individuals, a securities market enlarges the aggregate amount of funds available to finance production and promotes a desirable allocation of the funds among the several industries [25].

Regardless of the country in which an exchange is located, its basic function is the same, even though, the form of securities traded, the organizations of the market, measures of performance and the mechanical procedures differ.

The major exchanges ranked over the world by market value listed shares were at the end of 1985 as follows [4], [18] :- NSYE 1783 billion, Tokyo 731 billion, London 302 billion, Toronto 130 billion, Frankfurt 118 billion, Zurich 63 billion, Paris 58 billion, Milan 45 billion and Amsterdam 42 billion.

2. MEASURES OF PERFORMANCE

Daily newspapers and journals report statistics about stock exchange performances in different parts of the world.

Perhaps the most important of these are the various market indexes which allow the investor to obtain a summary of daily prices and market activity.

In the field of stock prices, there are two types of indicators, averages and indexes.Although those two forms are sometimes treated as synonymous terms, technically stock price indexes are more refined methods of measuring changes in the level of stock prices than are averages. An average is simply the mean value for a specified group of stocks [18]. In contrast an index is usually a weighted average ratio calculated from an invaiably large number of stocks expressed in terms of a base value which is usually set to be (100, 10 or 1) at some year in the past, selected as a base year from which the index's base value is calculated in order to impart a sense of time perspective to the index, and as mentioned before, our area of interest will be in indexes in an attempt to find a new market index for Amman Financial Market.

3. AMMAN FINANCIAL MARKET (AFM)

Amman Financial Market (AFM) is a public financial institution, it was established in 1976, and started the first day of dealing on January 1st 1978. Commercial transactions are effected in the dealing room at (AFM), which functions as typical bourse, its objectives are set to include the mobilizing of savings, regulating and controlling the issuance of securities and dealing therein.

The AFM has become the government mandated vehical to regulate and institutionalize the fledjing of securities market in Jordan.

The AFM is managed through a managing committee consisting of six members appointed by the cabinet. These members represent, Central Bank of Jordan, Commercial banks, Specialized lending institutions, Companies' registrar at the ministry of trade and industry, and Amman chamber of industry. This committee is chaired by the general manager of AFM.

Since its foundation, the AFM has been operating through a dual markets structure, these are :-

- The Primary Market ; consists of shares issues and bonds issues. Yearly volume of new issues has increased since the establishment in 1978, where annual average growth was 56.7% for the years (1978 - 1982). A decline was noticed after the year 1982, but in 1987, a rise in the volume of new issues was realized once more.
- The Secondary Market ; consists of a) The Regular Market where most of the listed companies at the AFM are traded b) The Parallel Market which offers newly emerging companies an opportunity to have their shares traded in the orderly and fairly manner while preparing to meet the more rigid requirements of formal listing at the Regular Market c) Bonds which include corporate bonds development bonds, treasury bonds and treasury bills d) Transfers which include

inheritance transfers, interfamily transfers, transfers from abroad, and the unlisted companies' shares.

The AFM started its operations with (57) listed companies, this number increased to reach (122) by the end of (1987), where (105) companies are listed on the Regular Market, (13) companies on the Parallel Market and (5) companies waiting to be listed.

Since AFM is directly connected to the movement of local and incoming capital from abroad needed to be invested in the different projects. Therefore, the extent of the success of the AFM is again directly effected with the availability of laws and regulations that help create the necessary and suitable investing medium which provides the operative capital through the different monetary instruments. The main laws in conjunction with the above are ; the companies' act, inland revenue (income tax) act, investment incentives act and, foreign currency Control act [1].

Generally investors in the securities of AFM are of different groups, while individual stock holders are the main participantes in the market (around 600000 shareholders by the end of 1987), the participation of institutional investors is still limited in the market. The AFM is open to non - Jordanian investors, it has recently witnessed an increased attention by international financial institutions to invest in

the securities market in Jordan [21].

Market capitalization in 1987 was JD (1184.3) million divided as follows:

- JD (915) million for the Regular Market.
- JD (13) million for the Parallel Market.
- JD (18) million for the companies to be listed.
- JD (95.4) million for the Corporate bonds.
- JD (142.9) million for the development bonds.

4. AMMAN FINANCIAL PRICE INDEX (AFPI)

There exists a price index for AFM, this price index was introduced in 1978, It is based on stock prices of 38 different companies. To follow the general trend in the market, these 38 common stocks include 10 Banks, 5 insurance, 6 services and 17 industrials with a base value of December 31, 1979.

Amman Financial Price Index (AFPI) is computed as follows:-

- Every closing price for each of the 38 companies is divided by its corresponding base value of December 31, 1979, and its log is determined.
- The summation of the log of the 38 companies is the market index for that day.

$$\text{Price Index} = \sum_{i=1}^{n} \text{Log}(P_{it}/P_{io}) \qquad (1\text{-}1)$$

where:

P_{it} = Stock closing price for a particualr day.

P_{io} = Stock closing price on December 31, 1979.

5. OBJECTIVE OF THE THESIS

The objective of this thesis is, to develop new broad based market indexes for Amman Financial Market by applying Monte Carlo technique on identified index form statistical formulas, and testing alternating results for their adequacy with respect to Amman Financial Market status, conditions,sample size, representativeness and weighing method.

CHAPTER TWO
LITERATURE SURVEY

A fair statement regarding stock market indicator series is that; indexes are complex indicator often poorly understood and improperly used. This is not surprising because the theory of indexes is complex, and there is controversy even in academic circles as to which is the best method of construction and how distortions can develop. Nevertheless, they are widely used and quoted [6].

The experienced as well as amateurs can be ensnared by index complexities [17]. An index is ultimately a subjective entity. The precise form an index may take depends upon the criteria of the indexes creator. Nevertheless, there are some generally and conventionally acknowledged and common features of most indexes. Various stock market performance measures can differ with respect to construction and computation.

Most of the available literature used for this research described mainly the indexes used in the U.S.A, Although some of the literature was published outside U.S.A. Therefore an emphasis will be placed in the U.S indexes with a brief mentioning of other international indexes [3], [24] used over the world stock markets. The major stock indexes used over the world are as follows:

All - Ordinaries in Australia, TS 300 in Canada, CAC General in France, DAX General in Germany, Hang Seng in Hong

Kong, Milan Banco in Italy, Nikkei in Japan, Straits Times in Singapore, Swiss Bank in Switzerland and FTSE - 100 in United Kingdom.

1. INDEX FORM

A convention common to almost all market indicators [17] is that they are typically expressed in index number form. All that means is that some previous period's value is selected as the "base" (I_o) and set equal to some arbitrary value (10,50,100). Any periods total capitalization, can be converted to index number, simply by dividing through by the base period value (I_o).

This index number conversion could be explained in terms of capitalization - weighted illustration as follows :-

- Let $X million total, be chosen as the base for an index, I_o= $X million
- Express index numbers so that I_o = 100.00
- Consider that in time t , the total capitalization value for the outstanding stocks in the index is $Y, then.

Index value in time t = ($Y / $X) * (100.00) (2-1)

- If it was chosen that index numbers are to be expressed so that I_o = 50.00 and not 100.00 then ,

Index value in time t = ($Y / $X) * (50.00) (2-2)

2. INDEX OBJECTIVES

Indexes and averages [6] are designed to measure the

overall level of stock prices usually by measuring performance of a representative sample of individual stocks. This noble objective, while simple enough in concept, is difficult to implement. Index studies have shown that no index is perfect, no index is suitable for all applications, and no index will replicate its relative behaviour with other indexes on every occasion, so care must be taken when making general broad statements about these indicators. On the other hand, depending upon what the analyst is trying to achieve,and according to the allocation strategy of the investor , one index may clearly be superior to other.

3. MAIN TYPES OF INDEXES

Several designs for indexes [6] have been developed and there is a diversity in the numbers and types of stocks included in the index calculation. Generally, there are two main index categories, these are:

a-Broad based indexes.

These measure the change in the overall market value. They include a large number of common stocks in the calculation. They are economical indicators useful in assessing the overall level and prosperity. They are also suited for measurement of performance of large portfolios [10]. (eg. Standard & Poor's 500 and Wilshire 5000 Equity Index) .

b-Narrow based indexes.

These measure the change in a particular group or category of market sector (eg. insurance, industry . etc). They include stocks of the one category of the same nature of specialty. (eg. Dow Jones Industrial Average and Standard & Poor's Transportation Index) .

4. INDEX CONSTRUCTION

Every market index is constructed differently. A well constructed market index will give an indication of the prices of the entire population of stocks under consideration. In the selection of a market index with which to work, or the design of a new index,the following factors should be considered [9],[11] and [20].

4.1 The universe of stocks represented by the indicator.

4.2 Relative weights given to the stocks and method of averaging used.

4.3 Convenient units where an index should be stated in convenient units which are easy to understand and facilitate answering relative questions.

4.1 The universe of stocks represented by the indicator

This includes:

4.1.1 Sample Size:

The sample should be a significant fraction of the population studied because larger samples generally give clearer indications about what the underlying population is

doing, on the other hand; if the sample is too large it will be too costly to compile.

4.1.2 Representativeness:

The sample should contain heterogeneous elements representing all sections of the population, though, a sample of securities should not be limited to large firms or firms that are all in the same specialty.

4.2 The relative weight given to the stocks

The stocks comprised by an indicator must be combined to construct the index or average. Each stock, therefore must be assigned some relative weight there are three ways in which weights can be assigned.

(The term weighted is to be understood as used in literature pertaining to Financial Markets [9], [11], [20].*)*

4.2.1 Value-weighted Index:

The total market value of each stock index is computed by simply multiplying the price of each stock by the corresponding number of shares outstanding. The market value-weighted index is then computed by dividing the current total market value of all the stocks used to construct the index by the total market value of all these stocks in the initial or base period. Mathematically this is

expressed as follows:

$$\text{value - weighted index} = \frac{\text{Total market value in period t}}{\text{Total market value in base period}} * \left(\begin{array}{c}\text{index value in} \\ \text{base peiod}\end{array} \right) \quad (2\text{-}3)$$

4.2.2 Price - weighted Index:

A price - weighted index reflects change in the average price of the stocks used to construct the index, adjusting for stock splits. Assuming no stock splits between the base period and period t for any of N stocks, having the prices of (X1, X2 .....Xn), the average price index of N different stocks will be

$$\frac{X_1+X_2+.....X_n}{N} \quad (2\text{-}4)$$

When stock split or changes in the compositions of stocks are considered, then adjustment is required so that the indicator will not be misleading as a result of stock splits or the new composition. The adjustment is made by changing the divisor that is used to compute the average. The divisor is computed by looking for the value that will preserve the average price and provide comparability with previous years after stock splits.

4.2.3 Equally weighted Index:

4.2.3.1 Equally Weighted Arithmetic Index:

In an equally weighted arithmetic index, an equal

dollar amount is assumed to be invested in each stock comprised by the Index. If in base year, $N is invested in each of X stocks comprised by the index. And if in time period t, the prices were changed, then the index percentage change equals the arithmetic average of the percentage change in the prices of each of the X stocks. This property will always be true, but not for subsequent period to period comparisons.

4.2.3.2 Equally Weighted Geometric Index:

As just mentioned the equally weighted arithmetic index reflects the arithmetic average percentage change in the stocks comprised by the index calculated between the current period and the base period. The equally weighted geometric index has a similar interpretation. The difference is that, the geometric mean is used to compute the average percentage change in the stocks comprised by the index.[2]

The following steps are used to compute the geometric mean of the percentage change in the price of N stocks comprised by an index [11],[25].

Step 1 :

Compute the ratio of the price in period t to the base period for each of the N stocks comprised by the index.

Step 2 :

Multiply the ratios obtained in step 1.

Step 3 :

Find the Nth root of the product computed in step 2.

Step 4 :

Subtract 1 from the value obtained in step 3.

The equally weighted geometric index is calculated by multiplying 1 plus the geometric mean return by the value of the index in the base year.

A property of the geometric index is that both the period - to - period and the current period - to - base period percentage changes will be the same for the index and the individual stocks.

5. IMPLICATIONS FOR ASSET ALLOCATION STRATEGY

An important consideration for the hedger is the asset allocation strategy that corresponds to each of the computational methods discussed.[9]

1- A value - weighted index is an appropriate benchmark for an index fund that attempts to invest in "the market". Certainly, all investors in aggregate define the market. A value - weighted index represents the performance achievable by investing in all possible stocks in proportion to their market value.

2- A price - weighted index is an appropriate benchmark for

an investor who apportions his or her wealth among stocks in ratios that correspond to their current prices. Equivalently, this strategy implies that the investor invests in an equal number of shares of each stock regardless of the price.

3- Equally weighted:

(a) The equally weighted arithmetic index:

It is an appropriate benchmark for an investor who apportions his or her wealth in equal dollar amounts among all stocks selected.

(b) The equally weighted geometric index :

For this index type,comparable asset allocation strategy cannot be extended . Proponents of this type of index claim that arithmetic averages overstate attainable results. However, it is important to understand that results by a geometric index are simply unattainable by means of any portfolio strategy. That is an investor could not construct a portfolio of stocks whose total appreciation would equal the geometric mean of the percentage appreciation of all.

6. COMPARING INDEXES

Many security market indexes exist. To choose an index suitable for one's particular needs, a comparison between indexes can be evaluated by several methods. Three of them are:-[11]

1- The extent to which the indexes move together.

2- The extent to which the volatility of indexes is similar.

3- The similarity of the rates of return implied by movements

of each of the indexes.

To achieve the above methods, there are three perspectives from which the interrelationship between indexes can be viewed:-[6]

1- Graphical Analysis:

This is accomplished by preparing on overlay of the price history of an index with that of another.

2- Divergence Analysis:

This is a quantification of the evidence presented in the graphs. It compares percentage changes in the various indexes using simple linear regression method.

3- Correlation Analysis:

It measures the degree to which to indexes move in concert with one another.

Generally the indexes are not in lock step . Particular care is required when choosing an index fulfilling the particular need.

The objective of the three comparisons - graphic, divergence and correlation - is to assert in selecting the best index for its intended application.

7. STOCK PRICE INDEXES

The following is an overview of selected, widely used examples of stock price indexes utilizing several construction methods. These are:-

1- Dow Jones Indexes - USA

2- Standard & Poor's 500 Index - USA

3- The New York Stock Exchange (NYSE) Composite Index - USA

4- The American stock Exchange Price Level Index A.S.E - USA

5- Value Line Composite Average - USA

6- Nikkei Average (JAPAN)

7- Wilshire 5000 Equity Index - USA

8- NASDAQ - OTC Composite Index - USA

7.1 Dow Jones Indexes

The Dow is the US's oldest and one of the most ten quoted indexes.

Dow Jones *(the publisher of "The Wall Street Journal & Barron's")* published several indexes of which the Industrial Average (DJIA) is the most popular [19]. The average consists of 30 large industrial companies, and is considered a "blue chip" index (stocks of very high quality). Many people criticize the DJIA for being too selective and representing too few stocks. Never-the-less, the Dow Industrial do follow the general trend in the market and these 30 common stocks comprise over 25 percent of the market value of the 1550 firms listed in New York stock Exchange.

Dow Jones also publishes an index of 20 transportation stocks, 15 utility stocks and a 65 - stock composite average. The Dow Jones Industrial Average is a price weighted average which means that each stock in the average is weighted by its price.

Dow Jones & Company calculates the average by adding the closing prices of the component stocks and using a divisor [14] that is adjusted for splits, dividends, substitutions and mergers, where the divisor is reduced to maintain the average at the same level prior to any modification, otherwise the average will be lowered giving a miss leading appearance that investors are worse off [8].

$$DJIA = \sum_{i=1}^{30} P_{it}/divisor_t \qquad (2\text{-}5)$$

The DJIA is quoted in points, not in dollars, it has ranged between 500 and 3000 points in the 1980s. Dow Jones & Company has explained that each of these points equals about 7 cents in the market value of an "average share of stock". More candidly, the so called DJIA points are practically void of meaningful economic interpretation [11].

7.2. Standard & Poor's 500 Index

Standard and Poor's Corporation publishes several indexes. One of the most important is standard & poor's 500 index, known as S & P 500. It is a widely recognized barometer

of the stock market as a whole. It is the benchmark against which the performance of most portfolios is measured. As its name suggests, the S&P index is based on the stock prices of 500 different companies, 400 industrials, 40 utilities, 20 transportation and 40 financial institution [2].

As states by Standard & Poor's, the selection of issues for the S & P 500 is "with the aim of achieving a distribution by broad industry grouping that approximates the distribution of these groupings in the NYSE common stock population. Further, each stock included in the index is intended to be a viable representative within its industry group, without regard to its investment appeal. And while the S & P 500 are not the 500 largest companies, the total market value of the index is approximately 80% of the capitalization value of all stocks listed on the NYSE [17]. The S & P 500 is a capitalization weighted index so that change in the price of a particular stock will influence the index in proportion to the total market value of the outstanding common stock of that particular company. Such weighting eliminates the necessity for adjustments to compensate for stock dividends and splits, but mergers or bank ruptures sometimes necessitate substitutions. Like Dow Jones averages, the index is expressed in points and not in dollars and cents [18].

$$S \& P\ 500 = \frac{\sum_{i=1}^{500} P_{it}\ Q_{it}}{\sum_{i=1}^{500} P_{io}\ Q_{io}} * 10 \qquad (2\text{-}6)$$

The S & P 500 index is calculated using the base years (1941-1943 = 10). A base period of a few years is used in an effect to avoid distortions that might result from the use of a single day as a base of a level of an index [2].

7.3. The New York Stock Exchange Composite Index (NYSE)

The New York Stock Exchange Composite Index is a broad - based capitalization - weighted index that measures the changes in the aggregate market value of approximately 1500 stocks listed on NYSE Big Board.

The NYSE index is market value weighted. The impact of a component issue's price change is proportional to the issue's overall market value [6]

$$NYSE = \frac{\sum_{i=1}^{1500} P_{it}\ Q_{it}}{\sum_{i=1}^{1500} P_{io}\ Q_{io}} * 50 \qquad (2\text{-}7)$$

The base for the NYSE index is the total market of all common stocks listed on the NYSE on December 31, 1965 scaled to a base of 50, this index value was about the average price of a NYSE common share at that date [17].

The NYSE composite index is composed of four sub indexes. The NYSE Industrial, Transportation, Utilities and Finance indexes, which cover all NYSE listed stocks, although each group index is also published separately.

The four indexes are stated in points, but the composite index is expressed in dollars and cents [18].

In this index stock splits and stock dividends do not require an adjustment, because they do not affect aggregate market value, however adjustments are necessary to eliminate the effects of capitalization changes, new listings and delistings [12].

7.4. The American Stock Exchange Price Level Index (ASE)

The American Stock Exchange also developed its own index in 1966.[12] This is an unweighted index of price movements of all its traded stocks and warrants, derived by adding or subtracting the average net price change each day to the previous index value. It is therefore quite different from the usual stock market measures. Since only net changes are considered no account is taken of the relationship of the net change to the price of a stock. In this sense, it is comparable to the Dow Jones Average.

The use of net price changes has several interesting features. It avoids the problem of splits in that the only

time the index is affected is on the day after the splits. In practice the previous day's closing Index is adjusted when stock splits dividends, or cash dividends occur. When new listing appear the divisor used to obtain the average is increased correspondingly.

The base price is $16.88, the average price on April 29, 1966. Since values for the other periods are calculated by adding or subtracting net price changes, the index would more appropriately be called an average.

$$ASE_d = ASE_p + \frac{\sum_{i=1}^{N}[(P_{id}-P_{ip})/P_{ip}]}{N} \qquad (2\text{-}8)$$

$$16.88$$

where:

P_{id} = Stock price on that day.

P_{ip} = Stock price on the previous day.

ASE_d= American Stock Exchange Price Index in that day.

ASE_p= American Stock Exchange Price Index on the previous day.

N = number of companies listed in the index.

The official ASE index differs markedly in its behavior from an index based on an unweighted average of actual prices.

7.5. Value Line Composite Average (Index)

The value Line Composite Average is the broadest average (reported as index), it consists of approximately 1700 stocks, which collectively accounted for over 96 percent of the total dollar volume of equity trades in the United States. (Those issues covered in the Value Line Investment Survey).

This index gives equal weight to the percentage change in the prices of each of its component stocks, regardless of their absolute price levels or aggregate market values. An equally weighted index assumes that an equal dollar amount is invested in each constituent stock [9]. Unlike the other indexes, the Value Line Composite Average (Index) is a geometric average rather than an arithmetic average. In this process, the percentage change in the price of each stock is averaged so that one percent-change in a $ 10 stock would be given the same weight as one percent change in a $100 stock. Another quirk of geometric average is that it has a built in downward bias [2].

$$XVL = \left[\sqrt[N]{\prod_{i=1}^{N} \left(\frac{P_{it}}{P_{io}} \right)} - 1 \right] * 100 \qquad (2\text{-}9)$$

The Value Line Composite Average also have sub indexes; industrials, rails and utilities. This index is maintained by Arnold Bernhard &Co., publishers of the Value Line Investment Survey - [6], the adjustment for stock splits or

dividends is made by adjusting the closing price of the stock on the previous day to compute the relative change [12].

The Value Line Composite Average was set at 100 on June 30, 1961. Its ticker symbol is "XVL" or "VL" followed by the code letter for the current month.

7.6. Nikkei Average

Nikkei average [2] (formally called the "Nikkei Dow Jones Average") is the most widely recognized barometer of the Japanese stock market). It is a composite of 225 stocks traded on the Tokyo Stock Exchange where the listed companies are displayed in two sections, in 1986 there were 1052 corporate stocks listed on the First Section and 424 stocks listed on the Second Section [18].

This index is derived with the same method used to calculate the Dow Jones Average [10].

$$\text{Nikkei Average} = \sum_{i=1}^{255} P_{it}/\text{divisor}_t \qquad (2\text{-}10)$$

7.7. Wilshire 5000 Equity Index

Is a relatively new index which includes more common stocks than any other well-known index. It represents a value of over $1 trillion consisting of all actively traded common stocks, that is, equity securities for which

daily pricing is available, the inclusion of many stocks tends to reduce the influence of the more staid blue chips. It is a capitalization weighted price index with a base of December 31, 1970. [18]

7.8. NASDAQ - OTC Composite Index

The (National Association of Securities Dealers) which is the self-governing body of over-the-counter markets publishes several indexes [8]. NASDAQ-OTC Composite Index is a capitalization - weighted index which measures performance of issues traded over the counter [6].

$$\text{NASDAQ - OTC} = \frac{\sum_{i=1}^{2300} P_{it}\, Q_{it}}{\sum_{i=1}^{2300} P_{io}\, Q_{io}} * 100 \qquad (2\text{-}11)$$

This composite index combines stocks in six categories: industrial, bank, insurance, other finance, transportation and utilities. All domestic common stocks totaling about 2300 are included. The indexes are expressed in terms of bases of 100 established in 1971.[18]

CHAPTER THREE

TOOLS AND METHODS

Up to six techniques using database management systems will be used to analyze data and produce results, these techniques are:

- Monte Carlo Simulation
- Regression
- Correlation
- Coefficient of Determination
- Averages
- Populations and Samples

The following is a description of each of the above.

1. SIMULATION

1.1 Monte Carlo technique

The Monte Carlo Simulation technique [13] is an especially useful mean of analyzing situations to obtain approximate answers when a physical experiment or the use of analytical approaches is either too burdensome or not feasible. It has enjoyed widespread acceptance in practice because of the analytical power it makes possible without the necessity for complex mathematics. It is especially adaptable to computation by digital computers. Indeed, computer languages have been developed especially to facilitate Monte Carlo Simulation. The technique is sometimes descriptively called the method of statistical trials. It involves, first,

the random selection of an outcome for each variable (element of interest)the combining of these outcomes with any fixed amounts, and calculation if necessary to obtain one trial outcome in terms of the desired answer. This done repeatedly, will result in enough trial outcomes to obtain a sufficiently close approximation of the characteristic of the desired answer.

The key requisite of the Monte Carlo technique is that the outcomes of all variables of interest be randomly selected, so that the probability of selection of all possible outcomes be in exact accord with their respective probability distributions. This is accomplished through the use of random numbers and relating these numbers to the distributions of the variables. Random numbers are numbers which have been generated in such a way that there is an equal probability of any number appearing each time, regardless of what sequence is experienced at any prior time.

2. STATISTICAL TECHNIQUES

2.1 Regression

Regression analysis [5],[9],[17] is a statistical technique for modeling and investigating the relationship between dependent variable and a number of independent variables. The relationship between variables is characterized by mathematical model called regression equation:-

$$\hat{Y} = \hat{\beta}_o + \hat{\beta}_1 X \qquad (3\text{-}1)$$

The technique used in obtaining a regression equation is the "least squares" method which is said to be the best linear unbiased estimator that has least variance between two or more variables. This computes the line of "best fit" whose criterion is the minimization of the squared deviations of observations from the line. The best fit line is found by calculating the regression equation, and this will give various co-ordinates for y for given value of X

$$\hat{Y} = \hat{\beta}_o + \hat{\beta}_1 X \qquad (3\text{-}2)$$

The coefficients $\hat{\beta}_o$ and $\hat{\beta}_1$ can be found from the formula

$$\hat{\beta}_o = \hat{\beta}_o' + \hat{\beta}_1 \bar{X} \qquad (3\text{-}3)$$

where

$$\hat{\beta}_o' = \frac{1}{n} \sum_{i=1}^{n} Y_i = \bar{Y} \qquad (3\text{-}4)$$

and

$$\hat{\beta}_1 = \frac{\sum_{i=1}^{n} Y_i (X_i - \bar{X})}{\sum_{i=1}^{n} (X_i - \bar{X})^2} = \frac{S_{xy}}{S_{xx}} \qquad (3\text{-}5)$$

where:

S_{xy} = Covariance (X,Y) = $\frac{\sum XY}{N}$

S_{xx} = Standard deviation of X = $\frac{\sqrt{\Sigma X^2}}{N}$

N = The number of observations

It is also possible to compute the coefficients $\hat{\beta}_o$ and $\hat{\beta}_1$ from the following equations :-

$$\hat{\beta}_o = \frac{(\Sigma X^2 \Sigma Y) - (\Sigma X)(\Sigma X Y)}{N \Sigma X^2 - (\Sigma X)^2} \qquad (3\text{-}6)$$

$$\hat{\beta}_1 = \frac{N \Sigma X Y - \Sigma X \Sigma Y}{N \Sigma X^2 - (\Sigma X)^2} \qquad (3\text{-}7)$$

Often $\hat{\beta}_o$ is referred to as the constant and $\hat{\beta}_1$ as the regression coefficient. The coefficients express the importance of the independent variables in explaining the dependent variable. Generally, the regression of X on Y will only equal that of Y on X if there is perfect correlation between variables.

2.2 Correlation

The correlation coefficient [17],[26], denoted by the lower case Greek letter ρ is an index number that is never larger than positive unity and never smaller than negative unity symbolically;

$$+1.0 \geq \rho \geq -1.0 \qquad (3\text{-}8)$$

The correlation expresses the degree of statistical relationship between variables and seeks to determine how well a linear equation explains the relationship between variables. If two variables move up and down together in complete unison, these variables are said to be perfectly positively correlated. The correlation equals its upper limit of positive unity in this case. If two variables move perfectly inversely, they are said to be perfectly negatively correlated. In this case the correlation between variables

equal the lowest possible value of negative unity. If two variables tend to move inversely, but the relationship is not perfect, then the correlation is a negative number between 0 and -1.

If two variables are unrelated they are said to be uncorrelated. In this case the correlation coefficient equals zero.

The formula for the correlation between two variables represented by the symbols X and Y is given below by r (where estimator of P is the sample correlation coefficient r).

$$r = \frac{\text{Covariance } (X,Y)}{(\text{Standard deviation of X})(\text{Standard deviation of Y})} \qquad (3\text{-}9)$$

Where:

$$\text{Covariance } (X,Y) = S_{xy} = \frac{\sum X\,Y}{N}$$

$$\text{Standard deviation of X} = S_{xx} = \frac{\sqrt{\sum X^2}}{N}$$

$$\text{Standard deviation of Y} = S_{yy} = \frac{\sqrt{\sum Y^2}}{N}$$

then

$$r = \frac{\sum_{i=1}^{n} Y_i\,(X_i - \bar{X})}{\left[\sum_{i=1}^{n} (X_i - \bar{X})^2 \sum_{i=1}^{n} (Y_i - \bar{Y})^2\right]^{1/2}} \qquad (3\text{-}10)$$

$$r = \frac{S_{XY}}{(S_{xx}\,S_{yy})^{1/2}} \qquad (3\text{-}11)$$

It is important to note the strong relation between $\hat{\beta}_1$ (the regression coefficient) in the regression equation and

$$\hat{\beta}_1 = \left(\frac{S_{YY}}{S_{XX}}\right)^{1/2} r \qquad (3\text{-}12)$$

The sample correlation coefficient r measures the linear association between Y and X while B measures the predicted change in Y for a unit change in X.

2.3 Coefficient of Determination

In using regression equations a closely related quantity to the correlation coefficient is the coefficient of determination, [5],[6],it is often used to judge the adequacy of regression model, it gives a measure of the variability in variable Y accounted by movements in X, the formula for calculating coefficient of determination is

$$R = \frac{\text{explained variation}}{\text{total variation}} = r^2 \qquad (3\text{-}13)$$

Thus r (correlation coefficient) is the square root of the coefficient of determination.

2.4. Averages

An average is a figure which is representative of typical of group of data, and because it lies centrally within that group of data averages are often called "measures of central tendency " Two types of averages are referred to generally in investment matters, these are arithmetic average and the geometric average [15], [25].

Arithmetic average

This is given by the statistic

$$\overline{X} = \frac{X_1 + X_2 + \ldots\ldots X_n}{N} = \frac{\sum_{j=1}^{N} X_j}{N} \qquad (3\text{-}14)$$

where

X = the arithmetic mean

Geometric average

The geometric average [25] or geometric mean is the nth root of the product of n numbers. If five stock prices were used to compute the geometric mean, the mean would be

$$\text{Index value} = \sqrt[5]{A * B * C * D * E} \qquad (3\text{-}15)$$

2.5. Populations and Samples

Usage of the term population [26] in statistics is a carryover from the days when statistics was applied to sociological and economic phenomena. Nowadays, it is applied to set of collections of objects, actual or conceptual, and mainly to set of numbers or observations. In some cases the population is finite in other cases it is infinite, but generally it is impossible to observe all its values even if it is finite because it may be impractical or uneconomical to observe it in its entirety. Thus it is usually necessary to use a sample, a part of a population and infer from it results pertaining to the entire population. Clearly, such results can be useful only if the sample is in some way representative of

the population. To assure that a sample is representative of the population from which it is obtained, and to provide a frame work for the application of problems of sampling, the so called random samples are used. For sampling from finite populations, they are defined as a set of observations $x_1 \ldots\ldots x_n$ constitutes a random sample of size n from the finite population of size N if it is chosen so that each subset of n of the N elements of the population has the same probability of being selected.

There are several ways of assuring the selection of a sample that is at least approximately random. When dealing with finite population, we can serially number elements of the population and then selected a sample with the aid of a table of random digits. The purpose of most statistical investigations is to generalize from information contained in random samples about the population from which the samples were obtained.

Statistics is the science of drawing conclusions about populations based on an analysis of sample data from population. A subset of observations select from a population is called a sample.

3. DATABASE MANAGEMENT SYSTEMS

Database management system [16] have long been used to organize and manipulate large collection of data. These

systems are powerful computer programmes that can effectively manage a huge number of data elements. However these systems are expensive and run only on large, sophisticated computers.

These restrictions were removed by the introduction of the "dBase II", the first database management programme for micro computers. With the use of dBase II, and the later version dBase III+, users of smaller computers could begin to manage computerized data management at affordable prices. Ashton Tate dBase programmes are today's standards in their field.

dBase III+ performs most database management functions. The programme is actually a set of tools with which data can be organized, managed and manipulated in a simple and effective manner. The data entered is stored in a "database". Any data entered, or indeed part of it, can be displayed, changed, found, rearranged, analyzed, related and printed in any form required by the user.

3.1 Hierarchical Databases

A hierarchical database organizes its contents in a hierarchical tree. Besides identifying the data elements in the database, the hierarchical tree defines the relationships among these data elements. Several types of hierarchical models are available. The simplest one is the model that organizes all the data elements in the database in one

relationship. Other models view the relationship as one-to-many or many-to-many.

3.2 Basic Concept of a Relational Database File

A relational database file consists of two main parts. One part defines the structure of the data records, and the other contains the actual data. Before data can be put into a data base file, its pre-defined structure includes the names of the fields in a record, the number of characters in a field, and the type of information (eg alphanumeric, numeric, logical, data, memo) allowed in each field.

3.3 Data Records

A data record holds the data items for a single entry. Data records in a database file are usually arranged in the order in which they are entered. Each data record is assigned a sequential record number when the record is added to the database file. This sequential number is assigned by the programme. Records can be traced, referred to, manipulated by using their number if so required.

3.4 Data Field

A data field is a storage unit for holding a single data item within a data record. Each data field is given a name by which it is identified in the database, and the type of its contents is determined by the user and prior to the data entry.

3.5 Application of a Relational Database

A relational database provides an effective means to maintaining and manipulating large amount of information. Some useful functions can be performed on a relational database include:

1) Maintaining and updating the contents of a database file.
2) Locating and retrieving data that meet a given set of specifications.
3) Sorting and rearranging a set of data items into a predetermined sequence or order.
4) Performing mathematical operations on a set of data items that meet a certain criteria.

dBase III+ is a very useful programme for the purpose of this study.

The main database file will contain all relevant information on the Amman Financial Market activity in the period 1985-1989 according to the daily report produced by the market.

All 126 registered companies on the Amman Financial Market are entered in a special database file serving as a list of those companies. Each company will have an

identification serial number from 1 to 126 as per the market main list. Also, all companies are categorized in the four categories:

1. Banking.
2. Insurance.
3. Industrial.
4. Services.

CHAPTER FOUR

DATA PREPARATION

1. COLLECTING DATA

This includes:

1. Recognizing AFM as a financial institution, its objectives, structure, types of clients and investors, measures of performance, listed companies and capitalization.
2. Daily reports (for five years) of prices of common stocks, traded securities and volume of traded shares.
3. Supplementary information concerning:-
   a) Companies enlisted and those not listed into the Regular AFM during the period (1985-1989).
   b) Changes occurring on some companies as per the following:
      b.1) Merging operations with local or international companies and methods observed.
      b.2) Increasing of capital, distribution of free shares, and settlement of any balances of shares value.
   c) Base year and any problems resulting from changing capital as related to the base year, problems resulting from the institution of new companies not existing originally in the base year, and problems from the mergers of companies becoming one company after the base year.

d) Method of exchange of companies shares in AFM and fixing of prices.

e) Analysis of AFM index for the period (1985-1989) as per the following:

e.1) Method of calculation.

e.2) Enlisted companies and changes occurring on its capital structure.

e.3) Index behaviour.

4. Literature survey of methods of computation procedures and construction approaches of indexes.

5. Daily reports (for six months) of values of some international indexes.

2. DATA MANIPULATION

Data base management systems have been used to organize and manipulate data as follows:

1- All listed companies (126) in Amman Financial Market between (1985-1989) were entered in a special database file serving as a list of those companies. Each company had an identification serial number from 1 to 126 as per the market main list.

Also, companies were categorized in the four categories 1)Banking 2)Industrial 3)Insurance 4)Services. Each company also had a serial number within each of the categories above. The data elements entered and stored in the main database

file were:

a- Ref: it identifies company that had shares sold on that date, "1" was designated for the company that had shares sold on that day, "0" for those otherwise.

b- Dayserial: was assigned to each entry for the particular date, and in a sequential manner as produced on the daily report of the AFM.

c- Serial: is the identification serial number assigned to each company as per the AFM main list. It covers all companies from number 1 to 126. This is necessary to perform any operations for any one company or group of companies irrespective of their category.

d- Short: is an abbreviated name given to each company.

e- Category: is assigned to each category according to its activity. There are 4 categories from 1 to 4, and as explained earlier, this is used whenever any operation is required on the companies within one or more categories.

f- Catnumber: is the serial number assigned to companies within one category. This is another serial number that defines the one company. It can only be used in conjunction with the category number. It is used to perform any operation required to the company or companies of one category.

g- Date: is the date of the report of the AFM.

h- Shares: is the number of shares traded for the company on that date.

i- Price: is the closing price for the company on the date.

2- The establishment of individual data base files for each of the 126 companies which represents a detailed history of the respective company for the period (1985-1989) in terms of share price, and capital structure, these files can be retrieved and its data manipulated for any purpose required during the process of analyzing. The data element stored in each database file were:- 1) Serial 2) Category 3)Catnumber 4)Date 5)Shares and 6)Price. Each of the above data base files contains the transactions of 1247 dealing days (five years period) at AFM, if no trading occurred on any of those days. The closing price of the previous trading day is used for that company.

3- The establishment of a general type database file for all companies. This file includes details on changes in companies' capitals structure during the period (1985-1989), as well as a description to the capital structure if avail able in the base year, (Dec. 31, 1979). Or else (estimating this capital structure and hence the share price) for those companies which have been created after the base year in accordance with the same procedures used by AFM.

3. MEASURING DATA SUITABILITY AND STABILITY

It was essential to check the behaviour of each of these companies all over the period of five years to insure its fitness with the goal of this study. Method of measuring the

suitability of each of the listed companies was performed along the following channels:

1- Checking on the continuity of listing the respective company in the Regular AFM until 1991 without its exception from the list.

2- Verifying the date on which the respective company was entered in the list of Regular AFM.

3- Any essential change or adjustment that might have occurred on the respective company status, this includes.

a- companies mergers and the effect of their respective shares at the respective period of comparison becoming the shares of the merger company.

b- the effect of the distribution of free shares as paid devidents on capital structure of the company.

c- settling the balance of unpaid shares value by paid devidents in this respect.

d- any increase or decrease in the capital of the company.

4- The effect of the company's participation in AFM as reflected from the number of days of shares exchange during the period (1985-1989).

4. REMARKS OVER DATA SUITABILITY AND STABILITY

During the period (1985-1989). There has been some development occurring on the status of companies at AFM. It has been noted that:-

1- Already four companies were delisted by the AFM for several reasons during the period (1985-1989). These companies

are (9,10,25,26), *see appendix* A2.

2- There are companies that were enlisted in the Regular AFM after 1/1/85 as the following table, *see appendix* A2.

TABLE (1)
Companies Listed In The Regular Amman Financial Market For The Period (1985-1989)

Year of company listing	No of Companies	Remarks
1985	32	Started exchange after 1/1/85, During Year 1985.
1986	7	Started exchange after 1/1/86, During Year 1986.
1987	6	Started exchange after 1/1/87, During Year 1987.
1988	3	Started exchange after 1/1/88, During Year 1988.
1989	7	Started exchange after 1/1/89, During Year 1989

3- There are a group of companies that got merged in one company and one share. These companies are: (31, 33, 35, 36, 39, 42, 44, 45, 46, 47, 49, 50, 51, 52, 64, 121), *see appendix* A4.

4- There are several companies that had number of dealing days less than 10% of the 1247 dealing days used for the study. These companies are:
(5, 22, 23, 24, 29, 30, 35, 36, 44, 46, 55, 57, 72, 75, 76, 77, 79, 82, 92, 96, 104, 109, 122, 123, 124, 125, 126), *see appendix* A2.

5. MODIFICATION IN DATA DOMAIN AND DURATION

In consequence to the mentioned, modifications in data range and duration were carried out as follows:

1- The four companies delisted from the Regular AFM were dismissed from the study.

2- Duration of study period was modified as follows:

a- Cutting out the period (1/1/1985-31/12/1986) from the comparison years of study due to the relative excessiveness of the number of companies that were enlisted in 1985 on words. Otherwise estimate share prices would have been calculated for all those newly listed companies, from 1/1/1985 until its formal listing date. This process is very laborious and could unnecessarily deviate results accuracy.

b- In 1987 six companies were enlisted in the Regular AFM. Monthly share prices for these companies were estimated from 1/1/1987 until their official date of listing. These companies were (22, 43, 67, 71, 72, 80), *see appendix* A2.

The above approach of price estimation was applied due to the small number of companies involved, and to the relatively short period of estimation which did not exceed four months at most. Therefore it will have a negligible deviating effect on the end result. The AFM method of assumption was used in reaching estimate monthly prices.

c- In 1988 three companies were enlisted in the Regular AFM and were excluded from the study due to the fact that estimate prices would have been calculated for a lengthy

period exceeding a year (1/1/1987 - formal date of listing in 1988), which otherwise would seriously effect the end result. These companies are: (63, 70, 89), *see appendix* A2.

d- In 1989 seven companies were enlisted in the Regular AFM and were also excluded from the study for the same reasons as in (C). These companies are: (28, 31, 65, 66, 102, 119, 120), *see appendix* A2.

3- Resolving the problem of companies that were merged, which had different share prices until a certain date, then became merged in one company of one share after words; the case was resolved by calculating an assumed price covering the period before merging and using the merging formula for AFM.

4- The exclusion of all companies that had dull participation of stock exchange on dealing days totaling 10% or less than 1247 days involved in the study. These companies were considered as inadequate in representing the true activity of the market and therefore it could be unwise and infeasible to be included in any index calculation.

6. DATA DOMAIN AND DURATION

In consequence to all the above mentioned modifications, it was considered that the out coming data domain and duration became consequently covering the maximum balanced data representing actual companies history which is the closest to accuracy and is truly reflective of exchange movements in the Regular AFM.

Without jeopardizing the participation of any of the previously dismissed companies for the 1247 days, since it was confirmed that they also had less than 10% dealing days between (1/1/1987 - 31/12/1989). Four companies have also shown less than 10% participation during the 3 years (1/1/1987- 31/12/1989). These companies were (39, 53, 56, 58), *see appendix* A1.

Therefore the number of companies involved in the study has been reduced to 73 companies, also the period of study was reduced to three years (1/1/1987 - 31/12/1987 = 745 dealing days).

Therefore the final number of companies and their distribution as per their categories, whose data was used to extract the results of this study totaled to 73 *(see appendixes* A3 and B) and are as follows:

TABLE (2)
Distribution Of The Companies Participating In The Study According To Main Sectors

Sector	No. of Companies	Percentage
Banks	18	25%
Insurance	9	12%
Services	13	18%
Industry	33	45%

CHAPTER FIVE

MODELING

1. BUILDING THE MODEL

Once the compiling of information needed in the study was completed, the next phase taken was "building the model" required for developing different index simulations.

A model was prepared along the nature of the index which is necessarily a subjective entity. The precise form it may take depends on the creator, who has to see to it that it meets all the conditions needed to insure a well constructed index.

The model preparation steps involved the following:

1) Selecting the formulae necessary for working out indexes values.

2) Deciding on the size and representativness of the samples taken in forming the index in such a way that it will be suitable for use in testing companies that are applying same conditions in AFM and by using Monte Carlo Simulation. Following is a description of steps taken:-

1.1 Index Statistical Formulation

Since the stocks comprised by an indicator must be combined to construct the index, and as performance indicators come in a variety of forms, it was decided in preparing

indexes to refer to four commonly used approaches found quite suitable in working out a well constructed market index.

Following are the approaches referred to:

1.1.1 Approach 1:- Value weighted Index approach:

Which is a capitalization weighted index approach *(this approach is used by Standard & Poors Index)* so that change in the price of a particular stock influence the index in proportion to the total market value of the outstanding common stock of the particular company.

$$\text{Value weighted Index} = \frac{\sum_{i=1}^{n} P_{it}\, Q_{it}}{\sum_{i=1}^{n} P_{io}\, Q_{io}} \times 100 \qquad (5\text{-}1)$$

Where:

P_{it} = Stock closing Price for a Particular day

Q_{it} = Number of stocks outstanding for a particular day.

P_{io} = Stock closing price on base year.

Q_{io} = Number of stockks outstanding on base year.

It is calculated using the base price on Dec. 31, 1979.

1.1.2 Approach 2:- Price weighted Index approach

Which is a price weighted average *(this approach is used by Dow Jones and Nikkei Indexes)*, which means that each stock in the average, is weighted by its price. It is calculated by

adding the closing prices of the component stocks to calculate their average.

$$\text{Price weighted Index} = \sum_{i=1}^{n} P_{it}/n \qquad (5\text{-}2)$$

Where:

P_{it} = Stock closing price for a particular day.

n = Number of companies listed in the index.

1.1.3 Approach 3:- Equally weighted geometric index approach

Which gives equal weight to the percentage change in the prices of each of its component stocks *(this approach is used by Value Line Index)*, regardless of their absolute price levels or aggregate market values. It is a geometric average rather than an arithmetic average. In this approach the percentage change in the price of each stock isaveraged.

Equally weighted geometric Index =

$$\left[\sqrt[N]{\prod_{i=1}^{N} \left(\frac{P_{it}}{P_{io}} \right)} - 1 \right] * 100 \qquad (5\text{-}3)$$

Where:

P_{it} = Stock closing price for a particular day.

P_{io} = Stock closing price on base year.

N = Number of companies listed in the index.

It is set at 100 on Dec. 31, 1979.

1.1.4 Approach 4:- Unweighted Index approach of price move ments:

Which is an unweighted approached of price movement of all its traded stocks derived by adding or subtracting the average net price change each day to the previous index value *(this approach is used by The American Stock Exchange Price Index)*. Only net changes are considered and no account is taken of the relation ship of the net change to the price of a stock.

The base price is the average price on Dec. 31, 1979.

$$\text{Index}_d = \text{Index}_p + \frac{\sum_{i=1}^{N} \left[P_{id} - P_{ip}/P_{ip} \right]}{\text{Average price of N companies on Dec. 31, 1979}} \qquad (5\text{-}4)$$

Where:

Index_d = Index an a particular day

Index_p = index on the previous day

P_{id} = Stock price on that day

P_{ip} = Stock price on previous day

1.2. The universe of stocks represented

This involves:

1.2.1. Sample Size

Some samples were selected large enough to become a significant fraction of the population studied while others were not too large so as to have an easy compilation, and as per the following table.

TABLE (3)
Selected Sample Sizes Considered In The Study

Case	Sample Size	Number of companies participating
1	15%	10
2	25%	18
3	35%	25
4	45%	32

1.2.2. Representativeness

The ratio of participation of each sector of AFM in the sample size was determined according to the ratio of the number of companies such that finally, the sample contains heterogeneous elements representing all sections of population. The following two approaches were evaluated:-

1. Assuming all the enlisted companies to participate in the sample according to the four sectors at AFM. In this case distribution will be as follows:-

TABLE (4)
Distribution Of The Companies Listed In The Regular AFM According To Main Sectors

Sector Category	Percentage
Banks	25%
Insurance	21%
Services	19%
Industry	35%

2. Assuming the modified number of companies -73- to participate in the sample. In this case distribution will be as follows:

TABLE (5)
Distribution Of The Companies Listed In The Regular AFM And Participating In The Study According To Main Sectors

Sector (Category)	Percentage
Banks	25%
Insurance	12%
Services	18%
Industry	45%

Forty simulations were performed to check for the more suitable approach. It was concluded to dismiss distribution alternative (Number 1) as it gave inferior results relative to distribution alternative (number 2).

As a result of applying each of the mentioned "Sample size"and "representativeness", the numbers of companies participating in simulation trials distributed on their respective sectors came out to be as follows:

TABLE (6)
Distribution Of The Number Of Companies Participating In The Study According To Selected Sample Sizes And Sectors

Category	Sample size			
Sector Percentage	45%	35%	25%	15%
Banks 25%	8	6	4	2
Insurance 12%	4	3	2	1
Services 18%	6	4	3	2
Industry 45%	14	12	9	5
Total	32	25	18	10

1.3. Monte Carlo Simulation

After designating: - 4 combinations of statistical formulation for working out the index, and - 4 different sizes with respect to the segmentation of population studied; 16 cases emerged through which the index could be worked out.

Since the number of participating companies in the study is 73, and as the probability of entries meeting sample size conditions become very high. Therefore, and in order to successfully demark exactly the companies that will be entered in each of the mentioned 16 cases, it was decided to utilize the following Monte Carlo Simulation:-

1. The random selection of outcome for each variable.
2. Combining of outcomes to obtain one trial outcome in terms of the desired answer.
3. The above is repeatedly done in order to obtain sufficiently enough trial outcomes.

This was applied in the study as follows:-

1. Random Selection of the companies that will be enlisted in each index separately.
2. Calculating a numerical value for the index by applying the formula on the selected companies.
3. Repeat above mentioned steps.

Since there was 16 general cases of index creation, and each case had 10 simulated trials, therefore a total number of

160 Runs *(see appendixes* A3 *and* C) were performed.

1.4. Adequacy of Index Results

1.4.1. Testing Adequacy of Index Results

In order to obtain comprehensive information about indexes behaviour resulting from this study, the numerical values for the 160 indexes were subjected to a series of statistical checks using graphical, divergence and correlation analysis, and as follows:

1. Testing the extent of the relation of each company's share price and independently with the average price of the combined participating companies at AFM.

This is necessary to determine the degree at which the particular company's share price is geared with the remaining companies' average price.

2. Testing on the extent of the relation of each index resulting from the study with the prices of the market combined; this will prove the method with which the respective index was calculated.
3. Testing the extent of the relation of each index with a defined group of companies participating in AFM.
4. Testing the extent of the relation of a certain group of indexes in the study with the international indexes in each of Europe, USA and Asia.

1.4.2 Standards that will be used to measure adequacy of results

With reference to the immediately mentioned statistical checks used for testing adequacy of results. Comparisons with a group of standards was carried out; following is a detailed explanation of their function and purpose:-

1- Movement of the average price of the combined companies at AFM: This is meant to represent the average daily price for the group of companies entered in AFM and involved in the study; calculated over three years.

Movement of the average price of the combined companies =

$$\frac{\sum_{i=1}^{73} P_{it}}{73} \qquad (5\text{-}5)$$

Where:

P_{it} = Stock closing price for a particular day

2- Movement of market prices combined relative to the method of calculation of the respective index:- This is meant to apply each of the four formulae (four approaches), used in the study to calculate indexes, on the group of companies entered into AFM and participating in the study; application of the formulae to be calculated on daily basis and to cover three years period. This kind of standard was called GENERAL NAMED INDEX (GNI). The reason behind this naming is that it covers all companies as reflected in the following formulae.

a) GNI for value weighted index approach =

$$\frac{\sum_{i=1}^{73} Q_{it}\, P_{it}}{\sum_{i=1}^{73} Q_{io}\, P_{io}} \qquad (5\text{-}6)$$

where comparisons of trials (1-40) in *Appendix* C were tested against the value of this standard.

b) GNI for price weighted index approach =

$$\sum_{i=1}^{73} P_{it}/73 \qquad (5\text{-}7)$$

where comparisons of trials (41-80) in *Appendix* C were tested against the value of this standard.

c) GNI for equally weighted geometric Index approach =

$$\left[\sqrt[73]{\prod_{i=1}^{73} \left(\frac{P_{it}}{P_{io}}\right)} - 1 \right] * 100 \qquad (5\text{-}8)$$

where comparison of trials (81-120) in *Appendix* C were tested against the value of this standard.

d) GNI for unweighted index approach of price movements of a certain day =

$$\text{Index}_{\text{Previous day}} + \frac{\sum_{i=1}^{73} \left[\frac{P_{id} - P_{ip}/P_{ip}}{73} \right]}{N} \qquad (5\text{-}9)$$

Average price on Dec. 31 1979 of the 73 companies

where comparison of trials (121-160) in *Appendix* C were tested against the value of this standard.

It was considered necessary to compare results with GNI as these standards cover all entered companies and consequently represent actual reflection of movement in that day, and subsequently, if the behaviour of any index is in line with GNI, it will become "initially" an active market performance indicator.

3- A defined group of companies of those participating in AFM:- This is meant to compare any index resulting from the 160 trials with a group of companies not reaching in total 73 companies (as was the case with GNI). Since comparing the results of indexes only with GNI might not be sufficient because the actual activity of AFM does not cover the total of all entered companies every single day; some companies might not negotiate and exchange on a certain day while reverting to do the following. This was accomplished by comparing the results of every index with the results of the other 159 indexes. This was carried out on a daily basis for three years as every index represents a certain group of companies.

4- International Indexes: It was considered necessary to compare selected best index results in the study to determine

the relation, if any, of those indexes with the movement of other international markets. The above was calculated on a daily basis for six months period (1/3/1987-31/8/1989), selected indexes for the above comparison were obtained from the Wall Street and Financial Times Journals [7],[23], and as follows:

TABLE (7)
Selected International Indexes

INDEX	USED IN
Dax	Frankfurt
F.Times	London
Dow Jones	New York
Nikkie	Tokyo

2.DATABASE PROGRAMMES

After completing the theoretical description of the Model that was concluded to be suitable for preparing the study, it was necessary to start with the practical operations needed to implement the theory. This was achieved by (Fox-base), a com puter database management systems software. Forms of calculation required the manipulation of quite tremendous number of data elements such that some of the calculations involved as high as 15,000,000 basic mathematical operations.

This was achieved by the working out of the respective various computer programmes *(see appendix* D*)* through three different stages; The following is a brief description of these stages.

2.1. First stage:

This stage is related to sectioning and adjusting compiled data, it covers the following:-

1- Programme No.1.

This programme performs sectioning of data collected for all the companies covering the period (1/1/1985-31/12/1989) as taken from AFM daily reports into 126 files, each for one respective company.

2-Programme No.2.

This programme carries out the reduction of study period of the participating companies to three years period (1/1/1987- 31/12/1989).

2.2. Second Stage:

This stage is concerning the performance of a number of mathematical operations necessary to obtain elementary results, it covers the following:-

3- Programme No.3.

This programme create a random number generator using both Monte Carlo Simulation concepts, and the proper selection of random samples and percentages.

4- Programme No.4.

This programme is applied on all companies for a three

years period to calculate the elementary values needed to calculate indexes values, calculations are made using each of value weighted, price weighted and equally weighted geometric approaches.

5- Programme No.5.

This programme is applied on all companies for a three years period to calculate the elementary values needed to calculate indexes values by using unweighted index approach of price movements.

2.3. Third Stage

This stage is concerning the analysis if results and involves the following:

6-Programme No.6.

This programme calculates one (example) case of GNI cases.

7- Programme No.7.

This programme calculates one (example) simulation case.

8-Programme No.8.

This programme calculates a group of statistical standards for each index to determine the extent of the later relation with market movements.

9- Programme No. 9.

This programme calculates a group of statistical standards to determine the relation of each index with a group of companies (other indexes); also the relation of indexes with international indexes are determined.

CHAPTER SIX

CALCULATIONS AND ANALYSIS

1. ADEQUACY TESTS:

Results of Monte Carlo Simulations were obtained (as explained) from the different sets of alternatives. Those results were thoroughly examined. Each result of index form was presented both mathematically and graphically. Evidences have shown that all produced indexes were closely related. To measure the relative volatility of the various indexes in the different forms, and to judge which indexes would be the best for application, adequacy tests were applied as follows:-

1.1 The application of the First Standard

Upon testing the relation between the daily share price of each company *(see appendix* B*)* and the average daily share pri through the application of the first standard test, a clear diversity was noted in this relation. While some companies recorded high positive correlation, some others recorded a contrary high negative one as indicated in the following table:

TABLE (8)
The Correlation Coefficients Resulting By Applying
The First Standard

Company Number	Correlation Coefficient Value
1	0.98282
2	0.12785
3	0.30533
4	-0.48726
5	0.74497
6	0.65055
7	-0.59884
8	0.79468
9	0.73172
10	0.85916
11	0.73263
12	0.61108
13	0.82126
14	0.94909
15	0.91347
16	0.85843
17	0.89673
18	0.17169
19	-0.80979
20	0.60996
21	-0.68814
22	0.43655
23	0.92942
24	0.87114
25	0.92530
26	0.77291
27	0.78783
28	-0.21369
29	-0.22591
30	0.91215
31	-0.07928
32	0.87520
33	-0.78408
34	-0.34621
35	0.76972
36	0.14210
37	0.12187
38	-0.06912
39	0.65825
40	0.69538
41	0.76998

TABLE (8)
The Correlation Coefficients Resulting By Applying The First Standard (Cont.)

Company Number	Correlation Coefficient Value
42	0.01544
43	0.91076
44	0.61692
45	0.21966
46	0.74429
47	0.82238
48	0.96200
49	0.70121
50	0.31469
51	0.49047
52	0.93049
53	0.70981
54	0.88996
55	0.95854
56	0.60014
57	0.55202
58	0.96873
59	-0.64695
60	0.84275
61	0.73329
62	0.21125
63	0.71644
64	0.93856
65	0.81873
66	0.92800
67	0.92896
68	0.95433
69	0.91316
70	0.95807
71	0.92810
72	-0.35651
73	0.90183

In the above table, company No.1 recorded the highest correlation of 0.98282 while company No. 19 recorded the lowest correlation of - 0.80979. Results of the above table were analyzed in an effort to explain the said inconsistency and to account for their diverse results in a form of a law or formula that will help in the study. Analysis was unrewarding

in this regard; while it was possible to explain the high correlation of company No.1 because the share price of that company forms a high proportion in the overall top ceiling price due to its high value, companies (No. 14, 15, 43, 52, 55, 64, 66, 67, 68 and 70) recorded similar high correlation that could not be explained generally, knowing that the prices and sectors of those companies were quite different. Therefore, this standard did not help in uncovering different structures that might be the best in creating suitable indexes. Consequently applying standard Number two was the next step.

1.2 Application of the Second Standard

The General Named Indexes GNI(s) containing all listed companies at AFM for each statistical formula were produced on daily basis. Simple liner regression and correlation analysis to measure direction and strength of the statistical relationship between each index and the above GNI (s) were performed, the results of calculated correlation coefficients are summarized in a matrix form as per the following table:

TABLE (9)
Correlation Coefficients Resulting By Applying
The Second Standard

Index Trial Number	Correlation Coefficient Value
INDEX TRIALS 1-40	
1	0.99588
2	0.99606
3	0.96857
4	0.96710
5	0.99480
6	0.98883
7	0.99429
8	0.97410
9	0.93872
10	0.88290
11	0.98859
12	0.96276
13	0.98040
14	0.99665
15	0.97910
16	0.91134
17	0.99720
18	0.99741
19	0.93924
20	0.99696
21	0.88383
22	0.99443
23	0.92251
24	0.92819
25	0.96959
26	0.99674
27	0.88392
28	0.97543
29	0.93097
30	0.99454
31	0.91282
32	0.91343
33	0.97583
34	0.97801
35	0.97465
36	0.93708
37	0.96239
38	0.96245
39	0.97503
40	0.92927

TABLE (9)
Correlation Coefficients Resulting By Applying
The Second Standard (Cont.)

Index Trial Number	Correlation Coefficient Value
INDEX TRIALS 41-80	
41	0.95608
42	0.96503
43	0.91163
44	0.95532
45	0.99417
46	0.63697
47	0.86351
48	0.83760
49	0.99625
50	0.70172
51	0.99190
52	0.59155
53	0.94103
54	0.75622
55	0.99522
56	0.99272
57	0.99004
58	0.99322
59	0.99337
60	0.20363
61	0.68030
62	0.96224
63	0.96095
64	0.90009
65	0.80446
66	0.97021
67	0.99019
68	0.96106
69	0.47471
70	0.98804
71	0.88241
72	0.97569
73	0.58626
74	0.97039
75	0.98831
76	0.96127
77	0.95409
78	0.96515
79	0.96769
80	0.98502

TABLE (9)
Correlation Coefficients Resulting By Applying
The Second Standard (Cont.)

Index Trial Number	Correlation Coefficient Value
INDEX TRIALS 81-120	
81	0.59550
82	0.99377
83	0.98736
84	0.99666
85	0.99546
86	0.99738
87	0.98319
88	0.99057
89	0.98677
90	0.99484
91	0.99552
92	0.98793
93	0.98821
94	0.99579
95	0.99529
96	0.98474
97	0.97807
98	0.99453
99	0.99089
100	0.99175
101	0.99492
102	0.98748
103	0.97198
104	0.98677
105	0.99128
106	0.98490
107	0.99538
108	0.99014
109	0.97911
110	0.99117
111	0.95949
112	0.97309
113	0.96368
114	0.98783
115	0.97862
116	0.98224
117	0.98076
118	0.95274
119	0.97975
120	0.98116

TABLE (9)
Correlation Coefficients Resulting By Applying
The Second Standard (Cont.)

Index Trial Number	Correlation Coefficient Value
INDEX TRIALS 121-160	
121	0.98776
122	0.98985
123	0.98798
124	0.99360
125	0.99570
126	0.98101
127	0.99170
128	0.99261
129	0.99349
130	0.98856
131	0.98294
132	0.97795
133	0.99260
134	0.98138
135	0.99253
136	0.99022
137	0.97209
138	0.99318
139	0.99101
140	0.98989
141	0.98370
142	0.98006
143	0.97848
144	0.98073
145	0.98375
146	0.96597
147	0.97986
148	0.98353
149	0.98414
150	0.99525
151	0.93455
152	0.95965
153	0.96455
154	0.94694
155	0.97291
156	0.93506
157	0.95539
158	0.98769
159	0.89438
160	0.96483

Results indicated that most of the indexes showed great ability to measure market performance; but still, when these results were arranged in order of their effectiveness, the methods used proved good capabilities in developing highly efficient indexes in the following order respectively: (Approach 3, Approach 1, Approach 4, Approach 2). However, it is necessary to emphasize that the above outcome does not minimize the capabilities of all methods in general. The above arrangement in respective order was meant to indicate the quite good probability of obtaining highly effective indexes.

Statistics were made to count the number of times in which indexes registered correlation values greater than 0.90 and up to 0.98 with GNI in steps of 0.1 for each cicle. Following tables indicate the distribution of the 160 indexes in this regard in accordance with four different approaches and sample sizes.

TABLE (10)
Distribution Of The Number Of Index Trials (1-40) Resulting By Applying The Second Standard on Approach 1 Trials According To Correlation Value And Sample Size

Correlation ranges	Sample size				Total
	15%	25%	35%	45%	
<.900	0	2	1	0	3
.90-.91	0	0	0	0	0
.91-.92	2	0	0	1	3
.92-.93	1	2	0	0	3
.93-.94	1	1	1	1	4
.94-.95	0	0	0	0	0
.95-.96	0	0	0	0	0
.96-.97	2	1	2	1	6
.97-.98	4	1	1	1	7
.98-.99	0	0	1	2	3
>.99	0	3	4	4	11
TOTAL	1	1	1	1	40

TABLE (11)
Distribution Of The Number Of Index Trials (41-80) Resulting By Applying The Second Standard On Approach 2 Trials According To Correlation Value And Sample Size

Correlation ranges	Sample Size				Total
	15%	25%	35%	45%	
<.900	2	3	4	3	12
.90-.91	0	1	0	0	1
.91-.92	0	0	1	0	1
.92-.93	0	0	0	0	0
.93-.94	0	0	0	0	0
.94-.95	0	0	0	1	1
.95-.96	1	0	1	0	2
.96-.97	3	3	1	0	7
.97-.98	2	1	0	0	3
.98-.99	2	1	0	0	3
>.99	0	1	3	6	10
TOTAL	10	10	10	10	40

TABLE (12)
Distribution Of The Number Of Index Trials (81-120)
Resulting By Applying The Second Standard
on Approach 3 According To Correlation Value
And Sample Size

Correlation ranges	Sample Size				Total
	15%	25%	35%	45%	
<.900	0	0	0	0	0
.90-.91	0	0	0	0	0
.91-.92	0	0	0	0	0
.92-.93	0	0	0	0	0
.93-.94	0	0	0	0	0
.94-.95	0	0	0	0	0
.95-.96	2	0	0	0	2
.96-.97	1	0	0	0	1
.97-.98	3	2	1	0	6
.98-.99	4	3	3	3	13
>.99	0	5	6	7	18
TOTAL	10	10	10	10	40

TABLE (13)
Distribution Of The Number Index Trials (121-160)
Resulting By Applying The Second Standard
On Approach 4 According To Correlation Value
And Sample Size

Correlation ranges	Sample Size				Total
	15%	25%	35%	45%	
<.900	1	0	0	0	1
.90-.91	0	0	0	0	0
.91-.92	0	0	0	0	0
.92-.93	0	0	0	0	0
.93-.94	2	0	0	0	2
.94-.95	1	0	0	0	1
.95-.96	2	0	0	0	2
.96-.97	2	1	0	0	3
.97-.98	1	2	2	0	5
.98-.99	1	6	3	4	14
>.99	0	1	5	6	12
TOTAL	10	10	10	10	40

In consequence of the above outcome, it was not possible to eliminate more than four indexes getting correlation values less than 0.5%. So all indexes were reconsidered and thus subjected to further correlation tests.

Further to the application of the First and Second Standards mentioned above, coefficients of the linear regression equations and the coefficients of determination were as well calculated as given in the results of appendix F.

1.3 Application of the Third Standard

To measure the adequacy of indexes and the level of fitness with respect to the general market trend, all indexes were subjected to further analysis by the implementation of the Third standard aiming at finding a correlation for each index with the group of other indexes. Results were produced and represented in a matrix displaying correlation coefficients for each pair of indicators *(as shown in appendix* E*)*.

These results showed good correlation between indexes in general but the quality of the goodness of these correlations varied. In analyzing the matrix data towards signaling out the best indexes, statistics were made to find the number of times in which each individual index registered correlation value greater than 0.90 and up to 0.98 with the other 159 pairs of indicators, in steps of 0.01 for each cycle. The following tables show the behaviour of the best ten

indexes resulting from the mentioned statistics distributed among each of the mentioned ranges of correlation and for each of the four methods.

TABLE (14)
The Best 10 Indexes Resulting By Applying The Third Standard On Approach 1 Trials According To Correlation Ranges (Index Trials 1-40)

No.	Correlation Range									
	>.90	>.91	>.92	>.93	>.94	>.95	>.96	>.97	>.98	>.99
1	13	6	6	6	6	28	25	6	28	11
2	25	25	25	28	28	6	28	28	20	22
3	37	13	28	25	33	33	6	25	5	35
4	6	28	33	37	25	20	37	37	7	39
5	8	33	37	33	20	25	20	38	22	2
6	33	37	8	38	17	18	33	33	2	5
7	15	15	13	20	38	17	18	20	11	7
8	28	38	3	13	13	37	13	17	18	18
9	38	3	38	18	18	2	38	18	39	20
10	34	34	20	2	37	38	2	26	17	17

TABLE (15)
The Best 10 Indexes Resulting By Applying The Third Standard On Approach 2 Trials According To Correlation Ranges (Index Trials 41-80)

No.	Correlation Range									
	>.90	>.91	>.92	>.93	>.94	>.95	>.96	>.97	>.98	>.99
1	79	79	79	79	72	79	79	79	79	49
2	77	77	72	72	79	72	72	72	42	55
3	72	44	77	42	42	74	77	42	41	41
4	44	72	44	44	44	42	42	76	45	45
5	42	42	42	77	77	77	44	68	49	58
6	76	76	76	76	68	44	74	44	55	67
7	68	68	68	68	74	68	68	74	56	70
8	66	74	74	66	66	66	76	77	58	75
9	74	66	66	74	76	76	55	55	59	80
10	78	78	78	78	78	78	66	41	67	56

TABLE (16)
The Best 10 Indexes Resulting By Applying The Third Standard On Approach 3 Trials According To Correlation Ranges (Index Trials 81-120)

NO.	Correlation Range >.9	>.91	>.92	>.93	>.94	>.95	>.96	>.97	>.98	>.99
1	86	86	84	82	98	104	88	86	90	90
2	110	84	107	98	104	88	89	98	84	98
3	94	91	82	104	82	82	84	84	88	100
4	91	110	101	84	90	84	90	104	95	95
5	101	92	110	90	100	86	105	101	85	99
6	84	101	114	101	86	100	86	90	98	84
7	81	107	90	107	88	99	82	100	99	89
8	82	85	91	85	91	89	107	105	100	94
9	85	94	104	86	99	98	85	94	107	83
10	92	90	85	105	101	90	94	82	86	85

TABLE (17)
The Best 10 Indexes Resulting By Applying The Third Standard On Approach 4 Trials According To Correlation Ranges (Index Trials 121-160)

NO.	Correlation Range >.9	>.91	>.92	>.93	>.94	>.95	>.96	>.97	>.98	>.99
1	139	150	158	158	126	158	126	158	126	125
2	126	138	126	126	158	126	150	125	125	126
3	138	158	145	145	145	145	158	145	150	131
4	158	126	150	138	138	150	125	131	131	139
5	149	139	138	150	150	138	145	139	158	158
6	125	145	127	139	125	125	138	138	136	136
7	121	142	130	131	131	139	139	149	145	145
8	142	125	139	142	130	131	149	136	127	149
9	127	131	142	125	139	149	127	142	138	122
10	141	130	125	130	142	127	131	127	149	124

In analyzing these results, it was possible to deduce 16 indexes found to be the best representation of the 16 general cases previously mentioned. Results are as per the following tables:

TABLE (18)
The Best 16 Indexes Developed By The Study According To Approach And Sample Size

Approach	Sample Size 15%	25%	35%	45%
1	33	28	6	13
2	79	68	42	55
3	114	107	91	84
4	158	150	138	125

TABLE (19)
Correlation Coefficient For The Best 16 Indexes Against GNI

Approach	Sample Size 15%	25%	35%	45%
1	0.97583	0.97543	0.98883	0.98040
2	0.96769	0.96106	0.96503	0.99522
3	0.98783	0.99538	0.99552	0.99666
4	0.98769	0.99525	0.99318	0.99570

1.4. The Application of the Fourth Standard

Upon the application of the fourth standard on the chosen group of indexes for the sake of finding its relation with international market indexes. Results showed that high correlation values exist with each of (Dax, Dow Jones, and F.Times), where correlation values exceeded 0.73 for all the above cases, whereas these values fell to its lowest level of 0.536 when compared with Nikkie (Tokyo). The following table shows all the results obtained in the fourth application:

TABLE (20)
Correlation Coefficient For The Best 16 Indexes
Against International Indexes

INDEX TRIAL NO.	International Indexes			
	DAX (FRANKFURT)	F.TIMES (LONDON)	DOW JONES (NEW YORK)	NIKKIE (TOKYO)
84	0.88796	0.84553	0.90465	0.76348
91	0.83173	0.79494	0.73747	0.53646
107	0.83726	0.78841	0.76305	0.56582
114	0.83390	0.75228	0.81903	0.65454
150	0.87436	0.82276	0.85614	0.67450
138	0.93823	0.89875	0.94023	0.79376
125	0.91233	0.86940	0.81403	0.61994
158	0.90939	0.85645	0.90716	0.74816
6	0.94532	0.91811	0.92013	0.77473
13	0.91690	0.89727	0.90723	0.74042
28	0.88409	0.86902	0.86335	0.68836
33	0.85851	0.84994	0.84851	0.65662
79	0.92308	0.93868	0.90169	0.76977
42	0.92872	0.92508	0.90484	0.74086
68	0.91897	0.92161	0.92451	0.76348
55	0.87325	0.84984	0.78443	0.67053

Further justification showed that when comparing the four international indexes, there exists a strong independent correlation between (Dax, Dow Jones and F.times) and a relatively weaker correlation with Nikkie of Tokyo which

further indicates that the Tokyo market seems to be less sensitive to parameters that might considerably effect the other international markets.

(TABLE 21)
Comparison Between International Indexes

INDEX NAME	International Indexes			
	DAX (FRANKFURT)	F.TIMES (LONDON)	DOW JONES (NEW YORK)	NIKKIE (TOKYO)
DAX	1.00000			
F.TIMES	0.90207	1.00000		
DOW JONES	0.91050	0.93238	1.00000	
NIKKIE	0.77023	0.77806	0.87365	1.00000

Therefore by applying the fourth standard on the 16 indexes it proves that they are all adequate and are geared with international indexes.

2. RESULT

By applying the four standards combined, the study concluded to the description of 16 indexes that registered best results as far as its relation with each of AFM and international markets. These indexes represented several statistical calculation methods, various fractions of population and different asset allocation strategies. The following tables summarizes the overall results of this study.

TABLE (22)
The Best 16 Indexes According To Correlation Value, Percentage And Approach

Index Trial No.	Correlation	Approach	Percentage
84	0.9966600	3	45
125	0.9957000	4	45
91	0.9955200	3	35
107	0.9953800	3	25
150	0.9952500	4	25
55	0.9952200	2	45
138	0.9931800	4	35
6	0.9888300	1	35
114	0.9878300	3	15
158	0.9876900	4	15
13	0.9804000	1	45
33	0.9758300	1	15
28	0.9754300	1	25
79	0.9676900	2	15
42	0.9650300	2	35
68	0.9610600	2	25

TABLE (23)
The Correlation Coefficient Between The Best Chosen Indexes And Both Amman Financial Market And The International Indexes

Index Trial	JORDAN	INTERNATIONAL INDEXES			
	(AMMAN)	Dax (FRANKFURT)	F.TIMES (LONDON)	DOW JONES (NEW YORK)	NIKKIE (TOKYO)
84	0.99666	0.88796	0.84553	0.90465	0.76348
91	0.99552	0.83173	0.79494	0.73747	0.53646
107	0.99538	0.83726	0.78841	0.76305	0.56582
114	0.98783	0.83390	0.75228	0.81903	0.65454
150	0.99525	0.87436	0.82276	0.85614	0.67450
138	0.99318	0.93823	0.89875	0.94023	0.79376
125	0.99571	0.91233	0.86940	0.81403	0.61994
158	0.98769	0.90939	0.85645	0.90716	0.74816
6	0.98883	0.94532	0.91811	0.92013	0.77473
13	0.98041	0.91690	0.89727	0.90723	0.74042
28	0.97543	0.88409	0.86902	0.86335	0.68836
33	0.97583	0.85851	0.84994	0.84851	0.65662
79	0.96769	0.92308	0.93868	0.90169	0.76977
42	0.96503	0.92872	0.92508	0.90484	0.74086
68	0.96106	0.91897	0.92161	0.92451	0.76348
55	0.99522	0.87325	0.84984	0.78443	0.67053

TABLE (24)
The Random Selection of The Companies Using Monte Carlo Simulation for The Best 16 Chosen Indexes

Sample size															
15%				25%				35%				45%			
Index Trial Number															
33	158	114	79	68	28	150	107	6	42	138	91	13	55	84	125
2	2	6	10	8	5	2	2	2	2	4	1	2	1	2	1
5	14	7	17	9	6	8	6	6	5	10	5	5	6	3	2
20	23	30	24	10	7	14	10	8	6	11	10	7	7	5	4
28	28	35	29	18	14	18	17	10	12	16	11	9	9	6	5
35	30	40	36	20	22	23	23	13	13	17	12	10	10	7	6
54	44	50	43	24	24	24	25	17	17	18	14	12	11	8	10
59	49	51	45	29	28	30	34	22	24	24	19	14	17	13	11
64	51	62	48	36	35	31	37	25	25	25	20	17	18	16	14
67	58	65	60	40	40	40	40	27	27	27	22	19	24	21	20
73	71	73	68	46	45	44	53	30	28	30	29	20	25	23	22
				53	48	46	57	32	29	32	31	21	26	24	26
				56	53	53	59	38	31	34	35	27	27	27	27
				59	55	59	62	40	32	59	40	29	28	30	29
				64	59	62	67	43	42	41	53	31	29	33	31
				66	61	64	68	45	46	43	56	32	31	35	32
				71	64	66	69	48	48	48	57	33	32	36	33
				72	72	71	71	51	52	49	58	36	33	37	34
				73	73	73	72	52	54	50	59	37	40	38	37
								53	57	51	62	43	41	41	45
								54	59	53	64	47	42	43	51
								55	64	54	65	49	43	48	56
								58	65	55	68	50	47	49	57
								60	71	56	71	51	49	50	58
								69	72	68	72	52	50	51	59
								72	73	71	73	53	56	52	60
												54	61	53	62
												60	62	54	63
												65	67	55	66
												70	68	56	67
												71	69	68	68
												72	71	70	69
												73	73	71	70

For more details see appendix A3

3. AMMAN FINANCIAL MARKET INDEX

3.1 Description

1- AFM index is composed of 38 companies. The relative 38 common stocks include 10 Banks, 5 insurance, 6 services and 17 industrials. Those companies are:-

[(3, 4, 5, 7, 8, 9,11, 12, 13, 14), (27, 29, 30, 34, 47), (54, 59, 60, 62, 63, 75), (80, 81, 83, 86, 87, 90, 91, 93, 94, 97, 98, 99, 100, 101, 102, 103, 106)], *see appedix* A1

2- AFM utilizes the following formula in calculating its Index.

$$AFMPI = \sum_{i=1}^{38} \log (P_{it} / P_{io}) \qquad (6\text{-}1)$$

Where:

P_{it} = Stock closing price for a particular day

P_{io} = Stock closing price on Dec. 31, 1979.

3- Companies listed in calculating AFM index covers 33% of the total companies listed in the Regular AFM through the end of 1989.

4- Seven out of the 38 companies listed in calculating AFM index were excluded from the study *(see appendix* A2*)* for reasons explained previously. Those seven companies are (74, 75, 76, 77, 79, 80), *see appendix* B2.

5- AFM index suffers from the following limitations:

- There are no clear criteria on which basis the AFPI sampling procedure was followed.

- Since the creation of AFPI it has not been tested for its goodness of fit with respect to the general market trend .
- The index was not properly watched and maintained to ensure its validity with respect to periodical situations concerning stock dividends , splits , mergers , making substitutions to replace unsatisfactory securities and , changing the number of stocks in the sampled list .
– It measures the relative change in the prices of outstanding common stocks compared to the base year prices , but it does not reflect the influence of the price of a particular component stocks in proportion to the total market value .

3.2 Analyzing Amman Financial Market Price Index (AFMI)

Amman Financial Market Price Index was subjected to same statistical standards which were used with all the indexes developed by the study. Therefore, and in order to measure the actual capabilities of the 38 companies group listed in AFM index, the group of companies were subjected to the same different forms of formulae used in the study. Four indexes (AFM1, AFM2, AFM3, AFM4) were devised for AFM index, where AFMn is the index resulting from applying formula No.n on the listed 38 companies, (n=1,2,3,4).

The four statistical standards were applied on the above given four forms. Results were as follows:

1- As mentioned previously, seven companies out of the 38 companies listed in calculating AFM index were excluded

leaving 31 companies under study. Results of applying the first standard on the 31 companies are reflected in table (8) already produced by the results of the study. On the other hand, results of the remaining (excluded 7 companies) are as follows:

TABLE (25)
The Correlation Coefficients Resulting By Applying The First Standard On The Group of Excluded Companies

Company Number	Correlation Coefficient Value
1	0.09273
2	-0.49424
3	-0.52723
4	0.00000
5	0.49633
6	0.00000
7	0.00000

2. Results of applying the second standard on the different developed AFMn index forms are given in the following table:

TABLE (26)
The Correlation Coefficients Resulting By Applying The Second Standard On The AFM Forms

Index Form	Correlation Coefficient
AFM1	.95608
AFM2	.59550
AFM3	.98776
AMF4	.96991

In comparing results of latter (AFM) with those produced by this study, in an effort to define their quality, their order of preference was as follows:

TABLE (27)
Ranks Obtained By Both AFMn And The Developed Indexes Resulting By Applying The Second Standard

Approach Of Construction			
1	2	3	4
18	49	86	125
17	55	84	150
20	45	94	124
26	41	91	129
14	59	85	138
2	58	107	128
1	56	95	133
5	51	101	135
30	67	90	127
22	57	98	121
7	75	82	139
6	70	100	136
11	80	105	140
13	72	110	122
15	74	99	130
34	66	88	123
33	79	81	158
28	78	108	149
39	42	93	145
35	62	92	141
8	76	114	148
25	68	**AFM3**	131
3	63	102	134
4	44	83	126
12	77	89	144
38	53	104	142
37	43	106	147
AFM1	64	96	143
19	71	87	132
9	47	116	155
36	48	120	137
29	65	117	**AFM4**
40	54	119	146
24	50	109	160
23	61	115	153
32	46	97	152
31	**AFM2**	112	157
16	52	103	154
27	73	113	156
21	69	111	151
10	60	118	159

The above table shows that it was possible to obtain; 27 indexes better than (AFM1) by using the first calculation method, 36 indexes better than (AFM2) by using the second calculation method, 21 indexes better than (AFM3) by using the third calculation method and 31 indexes better than (AFM4) by using the fourth calculation method. It is worth mentioning that all indexes produced by this study have a smaller index size than that of AFM.

3- Detailed results of applying the third standard on (AFM1, AFM2, AFM3, AFM4) are indicated in *(Appendix E)*, when surveying the number of indexes *(using the same procedure used in Table 14)* that gave better correlation results than those obtained by (AFM1, AFM2, AFM3, AFM4). Outcomes were as follows:

TABLE (28)
Number of Indexes That Gave Better Results Than AFMn Obtained By Applying The Third Standard

Index Form	Correlation Range								
	>.90	>.91	>.92	>.93	>.94	>.95	>.96	>.97	>.98
AFM1	103	103	102	112	117	111	104	93	85
AFM2	161	161	159	155	156	152	157	145	129
AFM3	28	16	16	21	22	35	46	64	86
AFM4	149	151	161	163	163	163	163	163	163

The number entered in every square in the above given table refers to the number of indexes of those developed by the study that gave better results than those of AFMn.

As previously mentioned the application of the third standard produced 16 indexes considered the best in this study; All the others (including AFM1, AFM2, AFM3, AFM4) were excluded.

4- The fourth standard concerned with international indexes was also applied on (AFM1, AFM2, AFM3, AFM4). Results were as follows:

TABLE (29)
Correlation Coefficients For AFMn Against International Indexes

INDEX FORM	DAX (FRANKFURT)	F.TIMES (LONDON)	DOW JONES (NEW YORK)	NIKKIE (TOKYO)
AFM1	0.90409	0.91455	0.91196	0.73683
AFM2	0.36046	0.49006	0.46800	0.37531
AFM3	0.37903	0.33434	0.42933	0.28198
AFM4	0.74639	0.75359	0.76659	0.59401

CHAPTER SEVEN

CONCLUSIONS AND RECOMMENDATIONS

1. CONCLUSIONS

This study has presented possible alternatives for the preparation of different forms of market indicators. Also it subjected all developed indicators to a series of statistical tests through lengthily mathematical operations to define the extent of the efficiency of these indicators. Consequently, the study has led over its different stages to the following results:-

1.1. Calculation Method

The study results gave visualization of the role of the used calculation method in defining the extent of index efficiency and the degree of the probability of obtaining a suitable index from each method. The study successive results pointed out to the capabilities of used calculation methods in producing suitable indexes along the following orders respectively. Method No. 3, (Equally weighted geometric index approach), Method No.1, (Value weighted index approach), Method No.4. (Unweighted index approach of price movements) Method No.2, (Price weighted index approach).

1.2. Sample Size

Results of all methods used to calculate indexes indicated the probability of obtaining satisfactory results

for all percentages used.However a greater number of the best index results subjected to statistical standards was favouring the larger sample size.

When arranging selected indexes serially according to the goodness of their results, the order of sample size used in the method, relative to the correlation value was as follows:- Method No.3: 45%, 35%, 25% and 15%, Method No.2: 45%, 15%, 35% and 25%, Method No.1: 35%, 45%, 15% and 25%, Method No.4: 45%, 25%, 35% and 15%.

In a detailed look on all the above mentioned methods results, as compared with method No.3, for example, the sample of 45% recorded the highest result where the correlation value was 0.99666, while the sample of 15% recorded the lowest result where the correlation value was 0.98783 giving a difference of 0.0883 when accounting for the effort needed to prepare an index of a 45% sample size against one of a 15% sample size and comparing the result difference which does not exceed 0.0883. One realize the justification in using a small sample size as it is capable of producing quite results approaching those of a larger sample size in quality.

1.3. Setting a certain structure for companies:

The study indicated that subjecting the same structure for the companies forming AFM index by using four different methods of calculation gave clear various results for the said

structure according to the method used; It was noted that the best performance was when applying formula No.3, the formula that was the basis on which the index was prepared in the first place. This finding indicates that it is not proper to set a certain structure for the group of companies and use it later to develop other forms of indexes that are resulting from changed methods of calculation while keeping the grouping of companies in the structure constant. If for example a group of companies was capable of producing an efficient index that can get along with the market by using "Value weighted approach", it is not quite certain that this grouping will realize the same good performance when using"price weighted approach".

1.4. Allocation Strategy:

Varied performance results with varied calculation methods used confirmed that calculation method used in AFM serves only one category of investors who would like to give equal weight to the percentage change in the prices of the component stocks regardless of their absolute prices. Moreover, it is not possible to apply the used index results to answer the requirements of all other investors in general.

1.5. AFM sensitivity:

Results indicated that the companies participating in AFM owns shares that are quite sensitive to current conditions; Shares movement either undergo a total prices rise, or on the

other hand, a general prices fall. In other words, the study indicated that any form of simulated indexes would have recorded relatively high correlation values, to the extent that made exclusion possibilities are invalid except in rare conditions. This indicates close behaviour tie-up that AFM shares exhibit.

1.6. International Markets:

The study indicated that AFM has the capability of getting along with the current conditions in the international Markets; statistical standards indicated a close relation between shares movement in AFM and those in the above markets. Such a finding was not expected due to the AFM shares high sensitivity to current conditions in local markets.

2. RECOMMENDATIONS

Based on the study results, the following recommendations are made:-

1) The necessity of devising more than one performance indicator in AFM such that investors of all sectors could be served no matter what their asset allocation strategies are. Therefore, it is recommended to have at hand three forms of indexes which represent appropriate benchmarks for:

a- The performance achievable by investing in all possible stocks in proportion to their market value .

b- The performance achievable by investing in an equal number of shares at each stock regardless of the price.

c- The performance achievable by investing wealth in equal monetary amounts among all stocks selected.

2) It is recommended to reduce the number of companies participating in the development of any index form such that the maximum sample size will be within the range of 15-25% only as the obtained results have indicated the capabilities of such sample sizes to produce indexes of high correlation factors, and in all cases higher than the correlation factor of the index used in AFM.

3) The necessity to continuously check considered indexes in order to confirm their validation. Or else, to perform any necessary maintenance procedure according to varying market parameters and any other indication. Therefore whenever any of the companies involved in the development of any indexes was excluded from the Regular AFM or was subjected to any other major charge in its status, then it is not enough to delist this company from the index, however, the index must be checked thoroughly to insure the continuity of its fitness and validity.

4) It is recommended that when setting a selected group of companies for the development of a certain index form, then these selected companies should not be used immediately to produce some other index using a different production formula; what suits a certain calculation method might not necessarily

suits some other.

5) As the indexes developed in this study were subjected to severe detailed and expanded testing procedures, therefore all index forms recommended by the study could be safely applied AT AFM.

Followings, are Further Research areas:

1) Development of a new concept concerning the construction of indexes which involves the effect of introducing volume of shares sold at AFM as a major parameter.

2) Portfolio selection at AFM.

3) Detailed and Individual study analyzing the behaviour of each of the companies listed at AFM.

BIBLIOGRAPHY

1- Adeeb K.Haddad, "Present Status and Prospects of Amman Financial Market", 1985.

2- B. Thomas Byme Jr. "The Stock Index Futures Market - A Trader's Insights and Strategis", Probus Publishing Company, Chicago Illinois, 1987.

3- Buell, Barbera, Holden Ted; Glasgall, William, "Why Tokyo's Stock Market is Still Soaring After all These Years". Business week, ISS 3062, July, 1988, PP 56-58.

4- Campbell, Katharine, "Futures: Calls of the Stock Index", Banker (UK), Vol. 137, ISS 731, January 1987, PP 93-99.

5- Dick R. Wittinl, "The Application of Regression Analysis", Allyn and Bacon Inc, 1988.

6- Donald T. Mesler, "Stock Index Options", Probos Publishing Company 118 North Clinton Chicago Illinois 60606,1986

7- Financial Times, Journal Issues (March-December) 1989.

8- Geoffrey A. Hirt, Stanley B. Block, "Fundamentals of Invest- ment Management", Homewood, Irwin, Second Edition 1986.

9- Gregory M. Kipnis, Frank J. Fabozzi, "Stock Index Futures", Dow Jones - Irwin Homewood, Illinois 60430 1984.

10- Holden, Ted, "The Tokyo Stock Market and How its Swings Affect You", Business Week, ISS, 3145, February, 1990, PP 74-82.

11- Jack Clark Francis, "Management of Investments", McGraw-Hill series in finance, Second (1980) and Fourth (1986) Editions.

12- James H. Lorie, Mary T. Hamilton "The Stock Market - Theories and Evidence", Richard D. Irwin Inc. 1973.

13- John R. Canada. John A. White, "Capital Investment Analysis Decision for Management and Engineering", Prentice - Hall, Inc, Englewood cliffs, N.J. 07632, 1980.

14- Lilgeblom, Eva, "The Informational Impact of Announcements of Stock Dividends and Stock Splits", Jrnl. of Business Finance and accounting (UK), Vol. 16, ISS, 5, winter, 1989, PP 681-697.

15- Michal Firth, "Investment Analysis - Techniques of Appraising the British Stock Market", Harper and Row, Publishers 1975.

16- Miriam Liskin, "Dbase III Plus: Programming and Techniques", Obsborne McGraw-Hill, 1987.

17- Neil S. Weiner," Stock Index Futures - A Guide for Traders Investors and Analysts ", 1984.

18- Richard J. Teweles. Edward S. Bradley," The Stock Market", a Trader's Insights and Strategis", Probus Publishing Company, Chicago Illinois 1987.

19- Spicer and Oppenheim Guide to Authors Securities Markets Around the world", John Wilely and Sons Inc. 1988.

20- Stevenson, Jennings Loy "Fundamentals of Investments", Fourth edition.

21- Studies and Research Department, "Amman Financial Market", 1978-1987.

22- Studies and Research Department, "Amman Financial Market Statistical Data (1978-1989).

23- Wall Street Journal, Journal Issues (February-December, 1989).

24- Wasser Fallen Walter, "Macroeconomics News and the Stock Market Evidence from Europe", Journal opf Banking and Finance, Vol. 13, ISS, 415, Semptember, 1989.

25- Wilford J. Eitenan, Charles A. DIce, David K. Eitenan, "The Stock Market", McGraw-Hill Book Company 1966 Fourth Edition.

26- William W. Hines, Douglas C. Montgomery, "Probability and Statistics in Engineering and Management Science", John Wiley and Sons. Second Edition.1984

APPENDIX A

DESCRIPTION OF THE COMPANIES LISTED IN THE REGULAR AMMAN FINANCIAL MARKET

APPENDIX A1

LISTED COMPANIES AT AMMAN FINANCIAL MARKET FOR THE PERIOD (1985-1989)

SERIAL	NAME	CATEGORY	CATNUMBER
1	ARAB BANK L.T.D	1	1
2	JORDAN NATIONAL BANK	1	2
3	CAIRO AMMAN BANK	1	3
4	BANK OF JORDAN	1	4
5	THE REAL ESTATE FINANCING CORP(REFCO)	1	5
6	INDUSTRIAL DEVELOPMENT BANK	1	6
7	THE HOUSING BANK	1	7
8	JORDAN KUWAIT BANK	1	8
9	JORDAN-GULF BANK	1	9
10	PETRA BANK	1	10
11	ARAB JORDAN INVESTMENT BANK	1	11
12	JORDAN ISLAMIC BANK	1	12
13	ARAB FINANCE CORP.(JORDAN)	1	13
14	JORDAN SECURITIES CORPORATION	1	14
15	JORDAN FINANCE HOUSE	1	15
16	NATIONAL FINANCIAL INVESTMENT	1	16
17	NATIONAL PORTIFOLIO SECURITIES	1	17
18	DARCO FOR INVESTMENT AND HOUSING	1	18
19	REAL ESTATE INVESTMENT	1	19
20	JORDAN INVESTMENT AND FINANCE BANK	1	20
21	AMMAN BANK FOR INVESTMENT	1	21
22	BETTEL-MAL SAVING AND INVESTMENT	1	22
23	AL-MASHERK EXCHANGE	1	23

24	MIDDLE EAST EXCHANGE	1	24
25	ISLAMIC INVESTMENT HOUSE	1	25
26	ARAB EAGLE EXCHANGE	1	26
27	JORDAN INSURANCE	2	1
28	MIDDLE EAST INSURANCE	2	2
29	UNITED INSURANCE	2	3
30	ARABIAN SEAS INSURANCE	2	4
31	GENERAL ARABIAN INSURANCE	2	5
32	JERUSALEM INSURANCE	2	6
33	ARAB EAGLE INSURANCE	2	7
34	JORDAN FRENCH INSURANCE	2	8
35	ARAB UNION INTERNATIONAL INSURANCE	2	9
36	ARAB BELGIAN INSURANCE	2	10
37	UNIVERSAL INSURANCE	2	11
38	YARMOUK INSURANCE AND REINSURANCE	2	12
39	HOLY LAND INSURANCE	2	13
40	ARAB LIFE AND ACCIDENT INSURANCE	2	14
41	PHILADELPHIA INSURANCE	2	15
42	JORDAN-GULF INSURANCE	2	16
43	THE NATIONAL AHLI INSURANCE	2	17
44	NATIONAL INSURANCE	2	18
45	ARAB INTERNATIONAL INSURANCE	2	19
46	JORDAN AHLI INSURANCE	2	20
47	GENERAL INSURANCE	2	21
48	ARAB UNION INSURANCE	2	22
49	JORDAN EAGLE INSURANCE	2	23
50	AL-EZDEHAR INSURANCE	2	24

51	BELGIAN INSURANCE AND REINSURANCE	2	25
52	JORDANIAN PETRA INSURANCE	2	26
53	REFCO LIFE INSURANCE	2	27
54	JORDAN ELECTRIC POWER	3	1
55	JORDAN HOTELS AND TOURISM	3	2
56	IRBED DISTRICT ELECTRICITY	3	3
57	JORDAN HIMEH MINERAL	3	4
58	GARAGE OWNERS FEDERATION OFFICE	3	5
59	DAR AL-SHA'AB PRESS	3	6
60	ARAB INTERNATIONAL HOTESL	3	7
61	LIVESTOCK AND POULTRY	3	8
62	JORDAN NATIONAL SHIPPING LINES	3	9
63	INTERNATIONAL CONTRACTING AND INVEST.	3	10
64	GENERAL INVESTMENT	3	11
65	JORDAN TOURISM AND SPA COMPLEX	3	12
66	THE UNITED MIDDLE EAST AND COMMODOR	3	13
67	JORDAN GULF REAL ESTATE INVESTMENT	3	14
68	PETRA ENTERPRISES AND EQUIPMENT LEAS.	3	15
69	MACHINERY EQUIPMENT RENTING AND MAINT.	3	16
70	JORDAN KUWAIT CO. FOR AGRICULATUREAN	3	17
71	JORDAN PRESS FOUNDATION (AL-RAI')	3	18
72	JORDAN PRESS AND PUBLISHING/DUSTOUR	3	19
73	JORDAN INVESTMENT AND FINANCIAL ADVANC.	3	20
74	JORDAN MACHINERY EQUIPMENT INSTRUMENT	3	21
75	INMA ARABIAN INVESMENT	3	22
76	MIDDLE EAST HOTEL	3	23
77	ADMINISTRATION AND CONSULTENTS	3	24

78	JORDAN TOBACCO AND CIGARETTES	4	1
79	THE TRANS JORDAN MINERAL RESOURCE	4	2
80	THE JORDAN CEMENT FACTORIES	4	3
81	JORDAN PHOSOHAT MINES	4	4
82	THE ARAB POTASH	4	5
83	JORDAN PETROLEUM REFINERY	4	6
84	JORDAN TANNING	4	7
85	WOOLEN INDUSTRIES	4	8
86	THE INDUSTRIAL COMMERICAL AND AGR.	4	9
87	THE ARAB PHARMACEUTICAL MANUFACT.	4	10
88	THE JORDAN WORSTED MILLS	4	11
89	JORDAN CONFICTIONARY FACTORIES	4	12
90	JORDAN CERAMIC INDUSTRIES	4	13
91	JORDAN DIARY	4	14
92	JORDAN PRINTING AND PACKAGING	4	15
93	JORDAN PAPER AND CARDBOARD FACTORIES	4	16
94	THE PUBLIC MINING	4	17
95	JORDAN SPINNING AND WEAVING	4	18
96	RAFIA INDUSTRIAL	4	19
97	THE JORDAN PIPES MANUFACTURING	4	20
98	JORDAN GLASS INDUSTRIES	4	21
99	THE ARAB CHEMICAL DETERGENTS IND.	4	22
100	DAR ALL DAWA DEVELOPMENT AND INVEST.	4	23
101	JORDAN LIME AND SILICATE BRICK INDUST.	4	24
102	ARAB INVESTMENT AND INTERNATIONAL	4	25
103	ARAB ALUMINUM INDUSTRY	4	26
104	MAS INDUSTRIES	4	27

105	ARAB PAPER CONVERTING AND TRADING	4	28
106	NATIONAL STEEL INDUSTRIES	4	29
107	NATIONAL INDUSTRIES	4	30
108	INTERMEDIATE PETRO-CHEMICAL INDUSTRIES	4	31
109	JORDAN INDUSTRIAL INVESTMENT CORP.	4	32
110	JORDAN CHEMICAL INDUSTRIES	4	33
111	JORDAN ROCK WOOL INDUSTRIES	4	34
112	UNIVERSAL CHEMICAL INDUSTRIES	4	35
113	ALADDIN INDUSTRIES	4	36
114	JORDAN INDUSTRIES AND MATCH/JIMCO	4	37
115	JORDAN WOOD INDUSTRIES/JWICO	4	38
116	NATIONAL CABLE AND WIRE MANUFACTURING	4	39
117	JORDAN SULPHO CHEMICALS	4	40
118	ARAB CENTER FOR PHARMACEUTICALS	4	41
119	JORDAN PRECAST CONCRETE INDUSTRY	4	42
120	NATIONAL QUARRY	4	43
121	JORDAN BEER	4	44
122	INDUSTRIAL DEVELOPMENT	4	45
123	JORDAN WOOD MANUFACTURING	4	46
124	ORIENT BATTERY MANUFACTURING	4	47
125	JORDAN FERTILIZERS INDUSTRIES	4	48
126	SOUTH CEMENT FACTORIES	4	49

105	ARAB PAPER CONVERTING AND TRADING	4	28
106	NATIONAL STEEL INDUSTRIES	4	29
107	NATIONAL INDUSTRIES	4	30
108	INTERMEDIATE PETRO-CHEMICAL INDUSTRIES	4	31
109	JORDAN INDUSTRIAL INVESTMENT CORP.	4	32
110	JORDAN CHEMICAL INDUSTRIES	4	33
111	JORDAN ROCK WOOL INDUSTRIES	4	34
112	UNIVERSAL CHEMICAL INDUSTRIES	4	35
113	ALADDIN INDUSTRIES	4	36
114	JORDAN INDUSTRIES AND MATCH/JIMCO	4	37
115	JORDAN WOOD INDUSTRIES/JWICO	4	38
116	NATIONAL CABLE AND WIRE MANUFACTURING	4	39
117	JORDAN SULPHO CHEMICALS	4	40
118	ARAB CENTER FOR PHARMACEUTICALS	4	41
119	JORDAN PRECAST CONCRETE INDUSTRY	4	42
120	NATIONAL QUARRY	4	43
121	JORDAN BEER	4	44
122	INDUSTRIAL DEVELOPMENT	4	45
123	JORDAN WOOD MANUFACTURING	4	46
124	ORIENT BATTERY MANUFACTURING	4	47
125	JORDAN FERTILIZERS INDUSTRIES	4	48
126	SOUTH CEMENT FACTORIES	4	49

APPENDIX A2

LISTED COMPANIES AT AMMAN FINANCIAL MARKET FOR THE PERIOD (1985-1989)

AND REMARKS ON COMPANY'S DISMISSAL REASONS

SERIAL	NAME	REASON
1	ARAB BANK L.T.D	
2	JORDAN NATIONAL BANK	
3	CAIRO AMMAN BANK	
4	BANK OF JORDAN	
5	THE REAL ESTATE FINANCING CORP (REFCO)	(A)
6	INDUSTRIAL DEVELOPMENT BANK	
7	THE HOUSING BANK	
8	JORDAN KUWAIT BANK	
9	JORDAN-GULF BANK	(B)
10	PETRA BANK	(B)
11	ARAB JORDAN INVESTMENT BANK	
12	JORDAN ISLAMIC BANK	
13	ARAB FINANCE CORP (JORDAN)	
14	JORDAN SECURITIES CORPORATION	
15	JORDAN FINANCE HOUSE	
16	NATIONAL FINANCIAL INVESTMENT	
17	NATIONAL PORTFOLIO SECURITIES	
18	DARCO FOR INVESTMENT AND HOUSING	
19	REAL ESTATE INVESTMENT	
20	JORDAN INVESTMENT AND FINANCE BANK	
21	AMMAN BANK FOR INVESTMENT	
22	BEITEL-MAL SAVING AND INVESTMENT FOR HOUSING	(A)

23	AL-MASHREK EXCHANGE	(A)
24	MIDDLE EAST EXCHANGE	(A)
25	ISLAMIC INVESTMENT HOUSE	(B)
26	ARAB EAGLE EXCHANGE	(B)
27	JORDAN INSURANCE	
28	MIDDLE EAST INSURANCE	(E)
29	UNITED INSURANCE	
30	ARABIAN SEAS INSURANCE	(A)
31	GENERAL ARABIAN INSURANCE	(E)
32	JERUSALEM INSURANCE	
33	ARAB EAGLE INSURANCE	(C)
34	JORDAN FRENCH INSURANCE	
35	ARAB UNION INTERNATIONAL INSURANCE	(A)
36	ARAB BELGIAN INSURANCE	(A)
37	UNIVERSAL INSURANCE	
38	YARMOUK INSURANCE AND REINSURANCE	
39	HOLY LAND INSURANCE	
40	ARAB LIFE AND ACCIDENT INSURANCE	
41	PHILADELPHA INSURANCE	
42	JORDAN-GULF INSURANCE	
43	THE NATIONAL AHLI INSURANCE	
44	NATIONAL INSURANCE	(A)
45	ARAB INTERNATIONAL INSURANCE	(C)
46	JORDAN AHLI INSURANCE	(A)
47	GENERAL INSURANCE	(C)
48	ARAB UNION INSURANCE	(C)
49	JORDAN EAGLE INSURANCE	(C)

50	AL-EZDEHAR INSURANCE	(C)
51	BELGIAN INSURANCE AND REINSURANCE	(C)
52	JORDANIAN PETRA INSURANCE	(C)
53	REFCO LIFE INSURANCE	
54	JORDAN ELECTRIC POWER	
55	JORDAN HOTELS AND TOURISM	(A)
56	IRBED DISTRIC ELECTRICITY	
57	JORDAN HIMEH MINERAL	(A)
58	GARAGE OWNERS FEDERATION OFFICE	
59	DAR AL-SHA'AB PRESS	
60	ARAB INTERNATIONAL HOTELS	
61	LIVESTOCK AND POULTRY	
62	JORDAN NATIONAL SHIPPING LINES	
63	INTERNATIONAL CONTRACTING AND INVESTMENT	(D)
64	GENERAL INVESTMENT	
65	JORDAN TOURISM AND SPA COMPLEX	(E)
66	THE UNITED EAST AND COMMODORE HOTELS	(E)
67	JORDAN GULF REAL ESTATE INVESTMENT	
68	PETRA ENTERPRISES AND EQUIPMENT LEASING	
69	MACHINERY EQUIPMENT RENTING AND MAINTENANCE	
70	JORDAN KUWAIT CO. FOR AGRICULTURE AND FOOD	(D)
71	JORDAN PRESS FOUNDATION (AL-RAI')	
72	JORDAN PRESS AND PUBLISHING / AD-DUSTOUR	(A)
73	INMA INVESTMENT AND FINANCIAL ADVANCES	
74	JORDAN MACHINERY EQUIPMENT INSTRUMENT RENTING	
75	INMA ARABIAN INVESTMENT	(A)
76	MIDDLE EAST HOTEL	(A)

77	ADMINISTRATION CONSULTENTS	(A)
78	JORDAN TOBACCO AND CIGARETTES	
79	THE TRANS JORDAN MINERAL RESOURCE	(A)
80	THE JORDAN CEMENT FACTORIES	
81	JORDAN PHOSPHATE MINES	
82	THE ARAB POTASH	(A)
83	JORDAN PETROLEUM REFINERY	
84	JORDAN TANNING	
85	WOOLEN INDUSTRIES	
86	THE INDUSTRIAL COMMERCIAL AND AGRICULTURAL	
87	THE ARAB PHARMACEUTICAL MANUFACTURING	
88	THE JORDAN WORSTED MILLS	
89	JORDAN CONFICTIONARY FACTORIES	(D)
90	JORDAN CERAMIC INDUSTRIES	
91	JORDAN DIARY	
92	JORDAN PRINTING AND PACKAGING	(A)
93	JORDAN PAPER AND CARDBOARD FACTORIES	
94	THE PUBLIC MINING	
95	JORDAN SPINNING AND WEAVING	
96	RAFIA INDUSTRIAL	(A)
97	THE JORDAN PIPES MANUFACTURING	
98	JORDAN GLASS INDUSTRIES	
99	THE ARAB CHEMICAL DETERGENTS INDUSTRIES	
100	DAR ALL DAWA DEVELOPMENT AND INVESTMENT	
101	JORDAN LIME AND SILICATE BRICK INDUSTRIES	
102	ARAB INVESTMENT AND INTERNATIONAL TRADE	(E)
103	ARAB ALUMINUM INDUSTRY	

104	MAS INDUSTRIES	(A)
105	ARAB PAPER CONVERTING AND TRADING	
106	NATIONAL STEEL INDUSTRIES	
107	NATIONAL INDUSTRIES	
108	INTERMEDIATE PETRO-CHEMICAL INDUSTRIES	
109	JORDAN INDUSTRIAL INVESTMENT CORP.	(A)
110	JORDAN CHEMICAL INDUSTRIES	
111	JORDAN ROCK WOOL INDUSTRIES	
112	UNIVERSAL CHEMICAL INDUSTRIES	
113	ALADDIN INDUSTRIES	
114	JORDAN INDUSTRIES AND MATCH/JIMCO	
115	JORDAN WOOD INDUSTRIES/JWICO	
116	NATIONAL CABLE AND WIRE MANUFACTURIN	
117	JORDAN SULPHO CHEMICALS	
118	ARAB CENTER FOR PHARMACEUTICALS	
119	JORDAN PRECAST CONCRETE INDUSTRY	(E)
120	NATIONAL QUARRY	(E)
121	JORDAN BEER	(C)
122	INDUSTRIAL DEVELOPMENT	(A)
123	JORDAN WOOD MANUFACTURING	(A)
124	ORIENT BATTERY MANUFACTURING	(A)
125	JORDAN FERTILIZERS INDUSTRIES	(A)
126	SOUTH CEMENT FACTORIES	(A)

KEY

REASON OF DISMISSAL

(A) LESS THAN 10% TRADING DAYS

(B) DELISTED BY AMMAN FINANCIAL MARKET

(C) MERGED

(D) DATE OF OFFICIAL LISTING (AFTER 01/01/88)

(E) DATE OF OFFICIAL LISTING (AFTER 01/01/89)

APPENDIX A3

LISTED COMPANIES AT AMMAN FINANCIAL MARKET

AND PARTICIPATING IN THE STUDY

FOR THE PERIOD (1985-1989)

NEW SERIAL	SERIAL	NAME	CATEGORY	NEW CATNUMBER
1	1	ARAB BANK L.T.D	1	1
2	2	JORDAN NATIONAL BANK	1	2
3	3	CAIRO AMMAN BANK	1	3
4	4	BANK OF JORDAN	1	4
5	6	INDUSTRIAL DEVELOPMENT BANK	1	5
6	7	THE HOUSING BANK	1	6
7	8	JORDAN KUWAIT BANK	1	7
8	11	ARAB JORDAN INVESTMENT BANK	1	8
9	12	JORDAN ISLAMIC BANK	1	9
10	13	ARAB FINANCE CORP (JORDAN)	1	10
11	14	JORDAN SECURITIES CORPORATION	1	11
12	15	JORDAN FINANCE HOUSE	1	12
13	16	NATIONAL FINANCIAL INVESTMENT	1	13
14	17	NATIONAL PORTIFOLIO SECURITIES	1	14
15	18	DARCO FOR INVESTMENT AND HOUSING	1	15
16	19	REAL ESTATE INVESTMENT	1	16
17	20	JORDAN INVESTMENT AND FINANCE BANK	1	17
18	21	AMMAN BANK FOR INVESTMENT	1	18
19	27	JORDAN INSURANCE	2	1
20	32	JERUSALEM INSURANCE	2	2
21	34	JORDAN FRENCH INSURANCE	2	3

22	37	UNIVERSAL INSURANCE	2	4
23	38	YARMOUK INSURANCE AND REINSURANCE	2	5
24	40	ARAB LIFE AND ACCIDENT INSURANCE	2	6
25	41	PHILADELPHIA INSURANCE	2	7
26	66	JORDAN ROCK WOOL INDUSTRIES	2	8
27	43	THE NATIONAL AHLI INSURANCE	2	9
28	54	JORDAN ELECTRIC POWER	3	1
29	59	DAR AL-SHA'AB PRESS	3	2
30	60	ARAB INTERNATIONAL HOTESL	3	3
31	61	LIVESTOCK AND POULTRY	3	4
32	62	JORDAN NATIONAL SHIPPING LINES	3	5
33	63	INTERNATIONAL CONTRACTING AND INVESTMENT	3	6
34	64	GENERAL INVESTMENT	3	7
35	67	JORDAN GULF REAL ESTATE INVESTMENT	3	8
36	68	PETRA ENTERPRISES AND EQUIPMENT LEASING	3	9
37	69	MACHINERY EQUIPMENT RENTING AND MAINTAINANCE	3	10
38	71	JORDAN PRESS FOUNDATION (AL-RAI')	3	11
39	73	INMA INVESTMENT AND FINANCIAL ADVANCES	3	12
40	74	JORDAN MACHINERY EQUIPMENT INSTRUMENT	3	13
41	78	JORDAN TOBACCO AND CIGARETTES	4	1
42	80	THE JORDAN CEMENT FACTORIES	4	2
43	81	JORDAN PHOSOHAT MINES	4	3

44	83	JORDAN PETROLEUM REFINERY	4	4
45	84	JORDAN TANNING	4	5
46	85	WOOLEN INDUSTRIES	4	6
47	86	THE INDUSTRIAL COMMERICAL AND AGRICULTURAL	4	7
48	87	THE ARAB PHARMACEUTICAL MANUFACTURIES	4	8
49	88	THE JORDAN WORSTED MILLS	4	9
50	90	JORDAN CERAMIC INDUSTRIES	4	10
51	91	JORDAN DIARY	4	11
52	93	JORDAN PAPER AND CARDBOARD FACTORIES	4	12
53	94	THE PUBLIC MINING	4	13
54	95	JORDAN SPINNING AND WEAVING	4	14
55	97	THE JORDAN PIPES MANUFACTURING	4	15
56	98	JORDAN GLASS INDUSTRIES	4	16
57	99	THE ARAB CHEMICAL DETERGENTS INDUSTRIES	4	17
58	100	DAR ALL DAWA DEVELOPMENT AND INVESTMENT	4	18
59	101	JORDAN LIME AND SILICATE BRICK INDUSTRIES	4	19
60	103	ARAB ALUMINUM INDUSTRY	4	20
61	105	ARAB PAPER CONVERTING AND TRADING	4	21
62	106	NATIONAL STEEL INDUSTRIES	4	22
63	107	NATIONAL INDUSTRIES	4	23
64	108	INTERMEDIATE PETRO-CHEMICAL	4	24

		INDUSTRIES		
65	110	JORDAN CHEMICAL INDUSTRIES	4	25
66	111	JORDAN ROCK WOOL INDUSTRIES	4	26
67	112	UNIVERSAL CHEMICAL INDUSTRIES	4	27
68	113	ALADDIN INDUSTRIES	4	28
69	114	JORDAN INDUSTRIES AND MATCH/JIMCO	4	29
70	115	JORDAN WOOD INDUSTRIES/JWICO	4	30
71	116	NATIONAL CABLE AND WIRE	4	31
		MANUFACTURING		
72	117	JORDAN SULPHO CHEMICALS	4	32
73	118	ARAB CENTER FOR PHARMACEUTICALS	4	33

Appendix A4

MERGERS OCCURED AT AMMAN FINANCIAL MARKET
OF MAJOR CONCERN TO THE STUDY
FOR THE PERIOD (1985-1989)

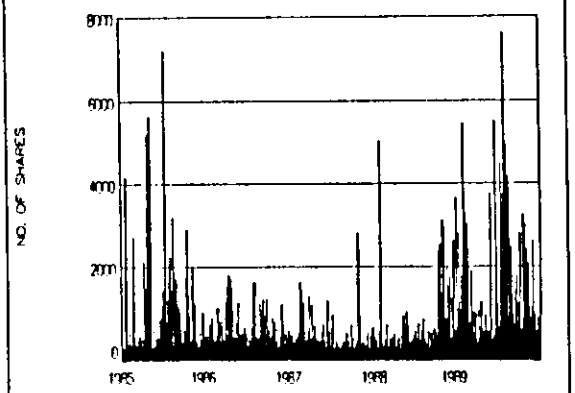
NUMBER	ACTION	SERIAL	COMPANY NAME	DATE
1	MERGING	44	NATIONAL INSURANCE	
		46	JORDAN AHLEE INSURANCE	
	RESULTED	43	NATIONAL AHLEE INSURANCE	01/10/86
2	MERGING	48	ARAB UNION INSURANCE	
		35	ARAB UNION INTERNATIONAL INSURANCE	
	RESULTED	45	ARAB INTERNATIONAL INSURANCE	01/10/85
3	MERGING	N/AFM	ARABIAN INSURANCE	
		47	GENERAL INSURANCE	
	RESULTED	31	GENERAL ARABIAN INSURANCE	09/08/89
4	MERGING	121	JORDAN BEER	
		64	GENERAL INVESTMENT	
	RESULTED	64	GENERAL INVESTMENT	01/04/87
5	MERGING	53	REFCO LIFE INSURANCE	
		49	JORDAN EAGLE INSURANCE	
	RESULTED	33	ARAB EAGLE INSURANCE	28/09/89
6	MERGING	42	JORDAN-GULF INSURANCE	
		50	AL-EZDEHAR INSURANCE	
	RESULTED	42	JORDAN-GULF INSURANCE	01/07/88
7	MERGING	51	BELGIAN INSURANCE AND REINSURANCE	
		N/AFM	LEBANON-SWISS INSURANCE	
	RESULTED	36	ARAB BELIGIAN INSURANCE	01/01/89
8	MERGING	N/AFM	JORDAN PETRA INSURANCE	
		39	HOLLY LAND INSURANCE	
	RESULTED	39	HOLLY LAND INSURANCE	16/01/89

APPENDIX B

THE DEVELOPMENT OF COMPANIES' SHARE PRICE and NUMBER OF SHARES TRADED

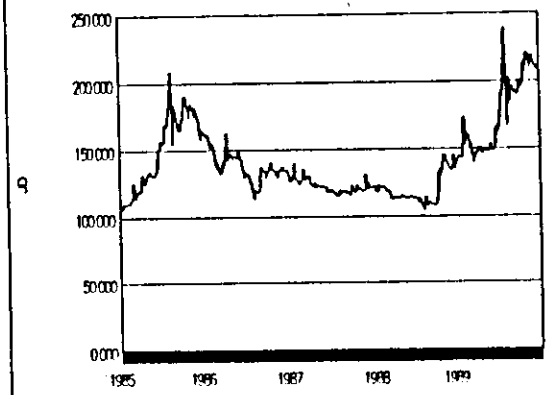
NO. OF TRADED SHARES (1985 -1989)

ARAB BANK



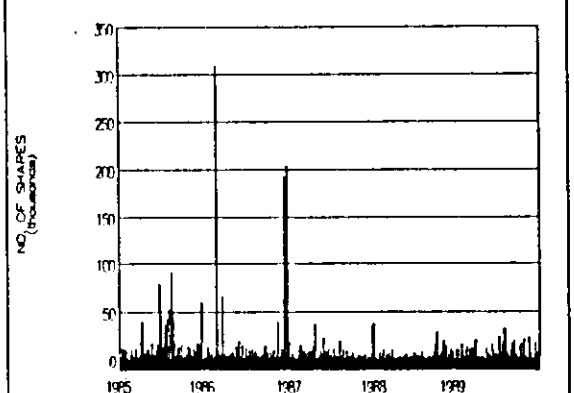
SHARE PRICE DEVELOPMENT (1985 - 1986)

ARAB BANK



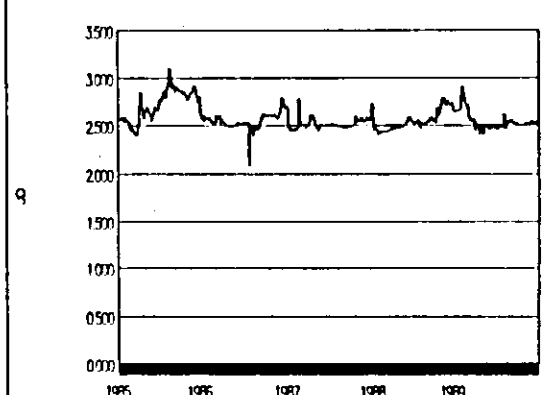
NO. OF SHARES TRADED (1985 - 1989)

AHLEE JORDAN BANK



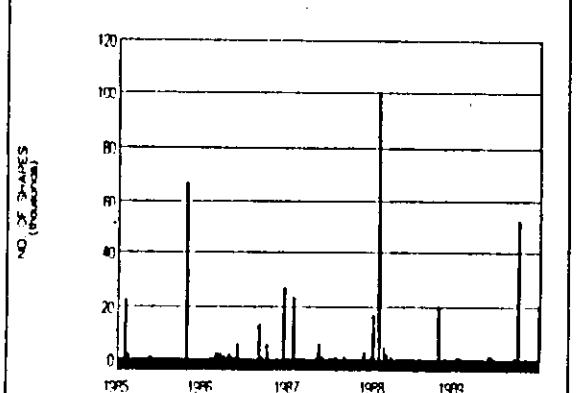
SHARE PRICE DEVELOPMENT (1985 - 1989)

AHLEE JORDAN BANK



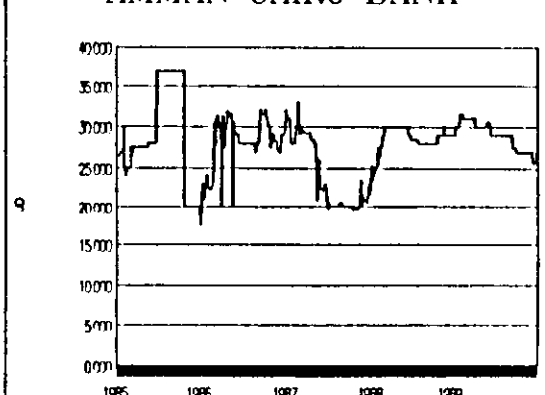
NO. OF SHARES TRADED (1985 - 1989)

AMMAN CAIRO BANK



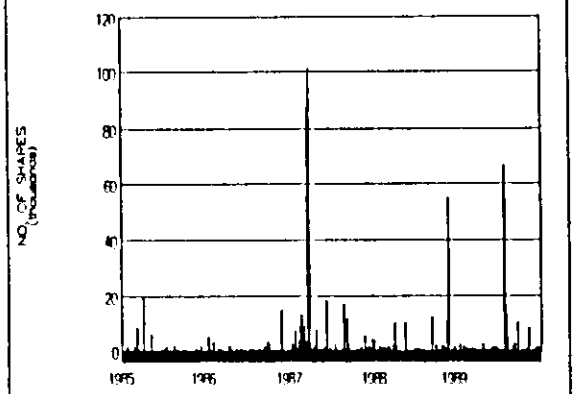
SHARE PRICE DEVELOPMENT (1985 - 1989)

AMMAN CAIRO BANK



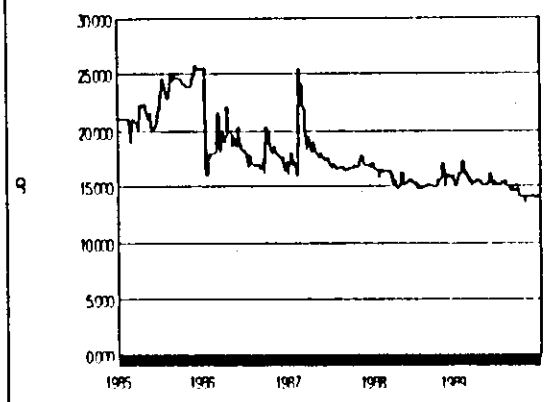
NO. OF SHARES TRADED (1985 - 1989)

BANK OF JORDAN



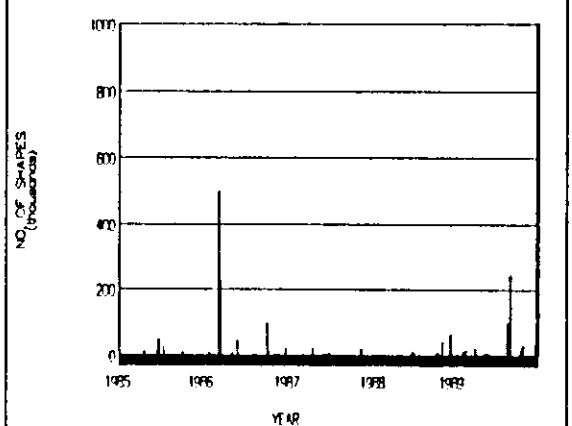
SHARE PRICE DEVELOPMENT (1985 - 1989)

BANK OF JORDAN



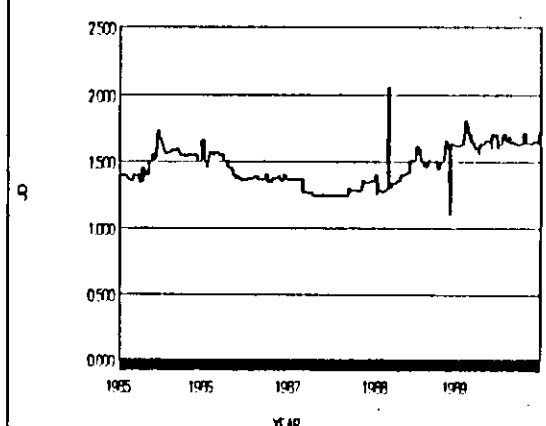
NO. OF SHARES TRADED (1985 - 1989)

INDUSTRIAL DEV. BANK



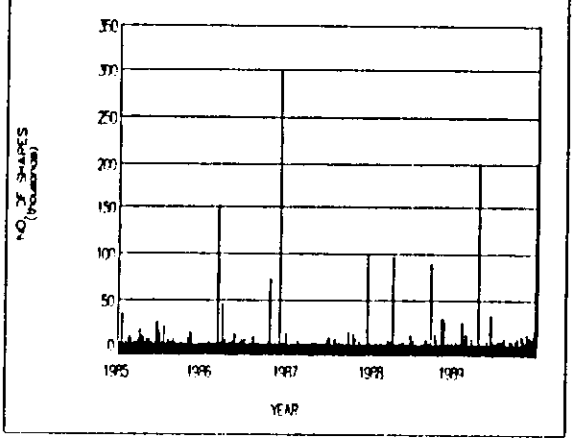
SHARE PRICE DEVELOPMENT (1985 - 1989)

INDUSTRIAL DEV. BANK



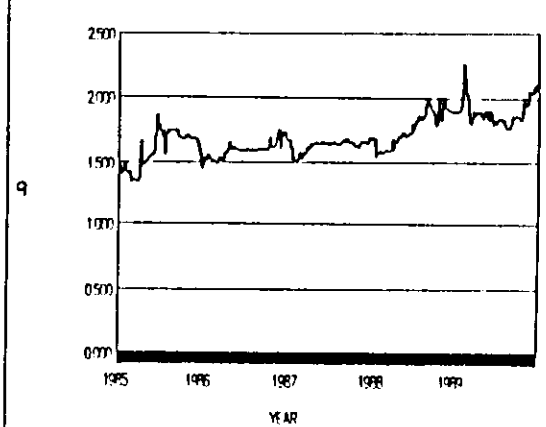
NO. OF SHARES TRADED (1985 - 1989)

THE HOUSING BANK



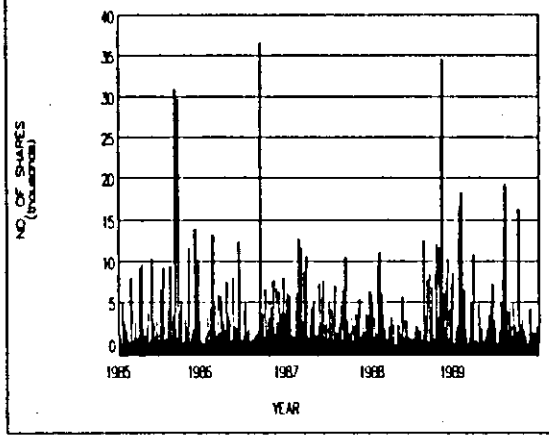
SHARE PRICE DEVELOPMENT (1985 - 1989)

THE HOUSING BANK



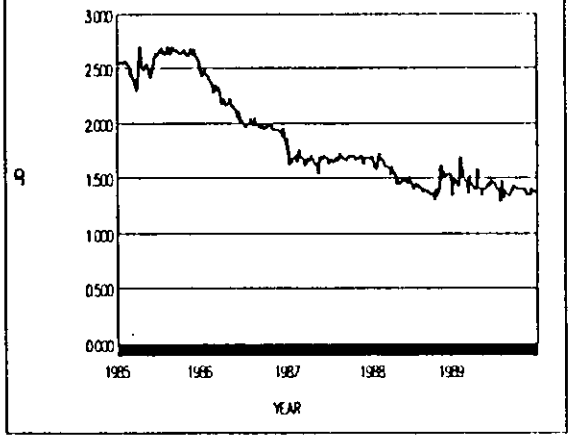
NO. OF SHARES TRADED (1985 - 1989)

JORDAN KUWAIT BANK



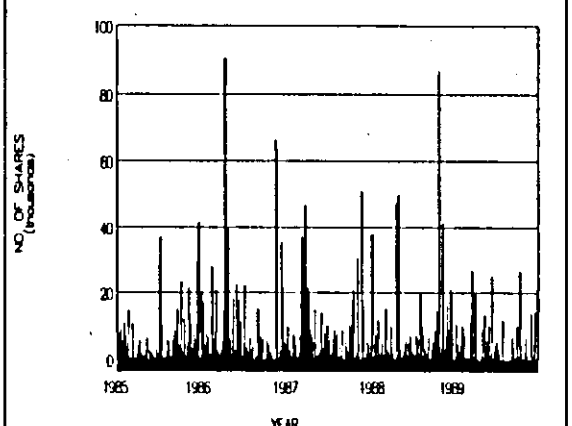
SHARE PRICE DEVELOPMENT (1985 - 1989)

JORDAN KUWAIT BANK



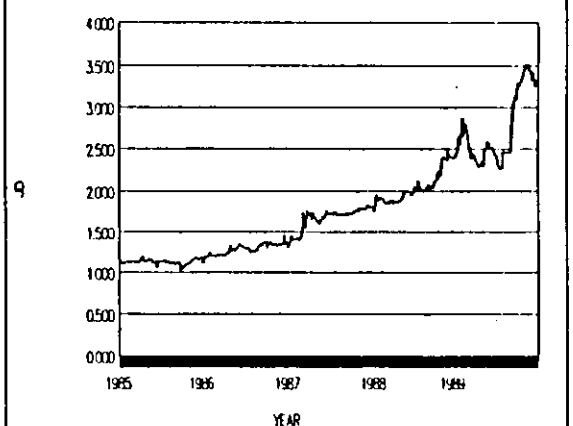
NO. OF SHARES TRADED (1985 - 1989)

JORDAN INVESTMENT BANK



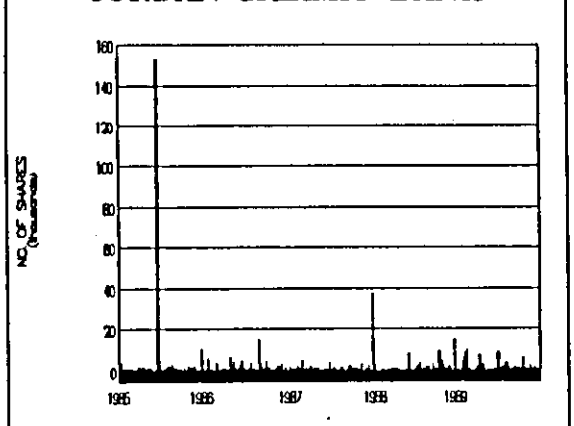
SHARE PRICE DEVELOPMENT (1985 - 1989)

JORDAN INVESTMENT BANK



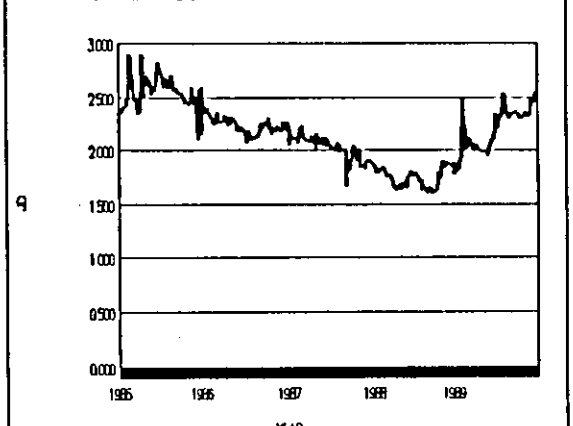
NO. OF SHARES TRADED (1985 - 1989)

JORDAN ISLAMIC BANK



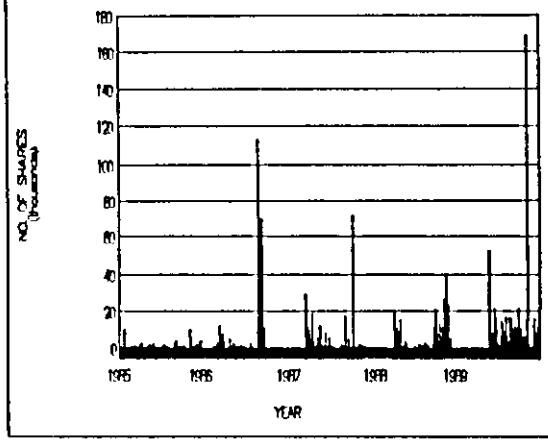
SHARE PRICE DEVELOPMENT (1985 - 1989)

JORDAN ISLAMIC BANK



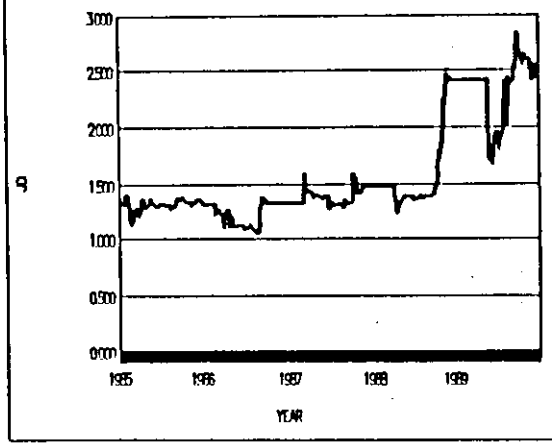
NO. OF SHARES TRADED (1995 - 1999)

ARAB FINANCE CORPORATION



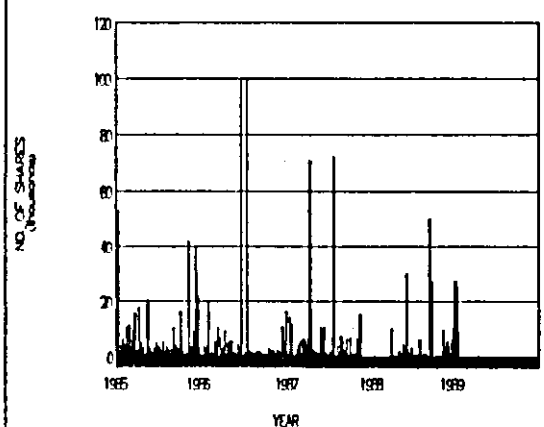
SHARE PRICE DEVELOPMENT (1995 - 1999)

ARAB FINANCE CORPORATION



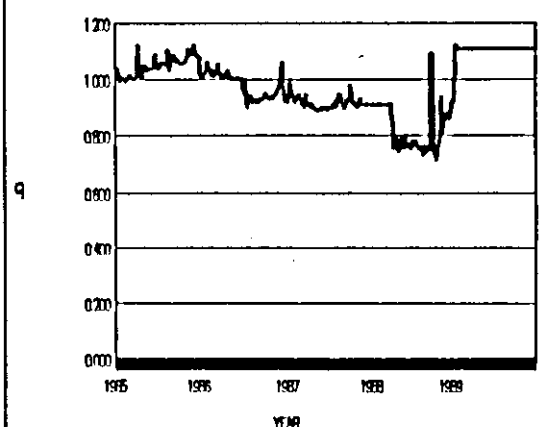
NO. OF SHARES TRADED (1995 - 1999)

JORDAN SECURITIES CORP.



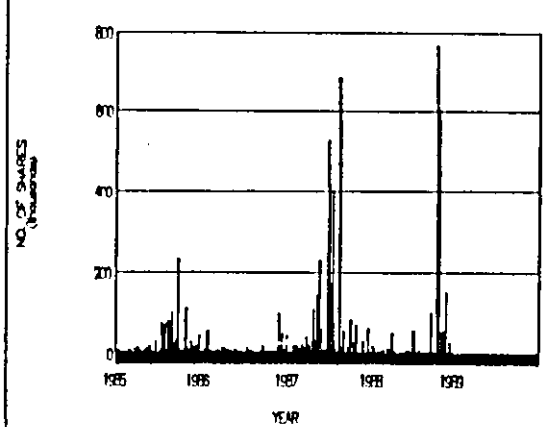
SHARE PRICE DEVELOPMENT (1995 - 1999)

JORDAN SECURITIES CORP.



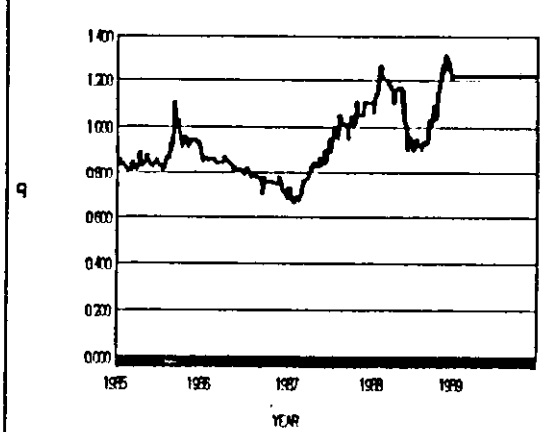
NO. OF SHARES TRADED (1995 - 1999)

JORDAN FINANCE HOUSE



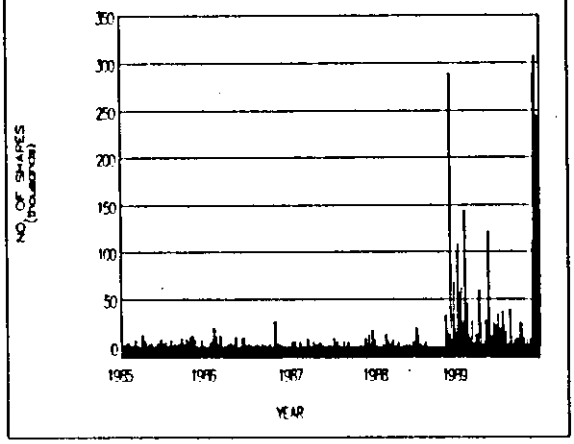
SHARE PRICE DEVELOPMENT (1995 - 1999)

JORDAN FINANCE HOUSE



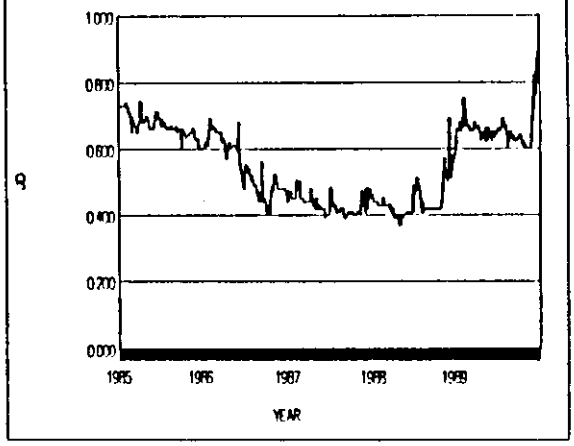
NO. OF SHARES TRADED (1985 - 1989)

REAL ESTATE INVESTMENT



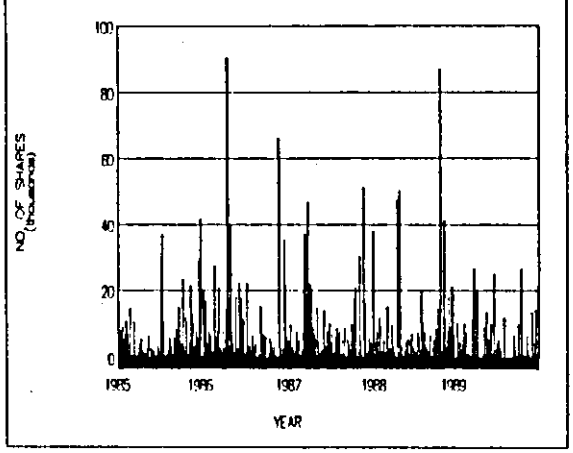
SHARE PRICE DEVELOPMENT (1985 - 1989)

REAL ESTATE INVESTMENT



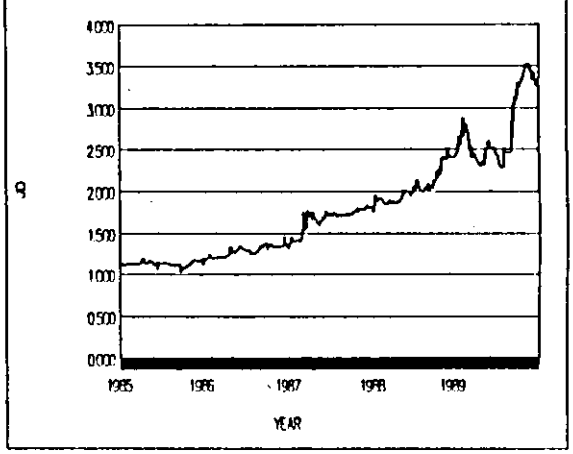
NO. OF SHARES TRADED (1985 - 1989)

INVEST. & FINANCE BANK



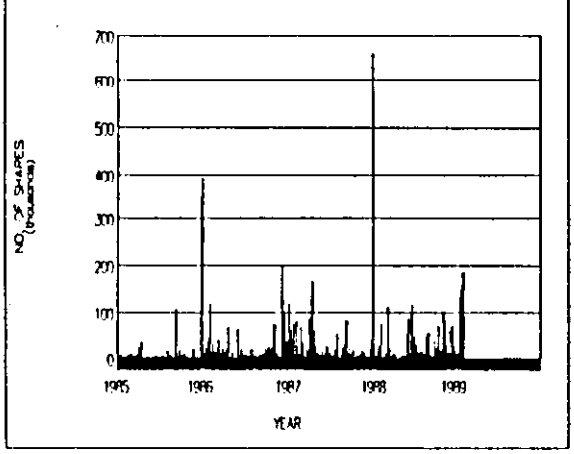
SHARE PRICE DEVELOPMENT (1985 - 1989)

INVEST. & FINANCE BANK



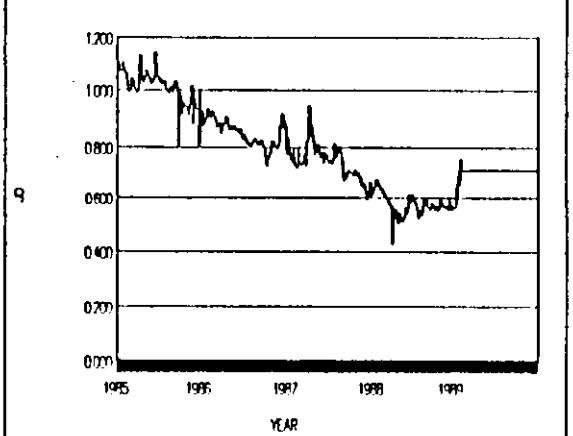
NO. OF SHARES TRADED (1985 - 1989)

AMMAN BANK FOR INVESTMENT



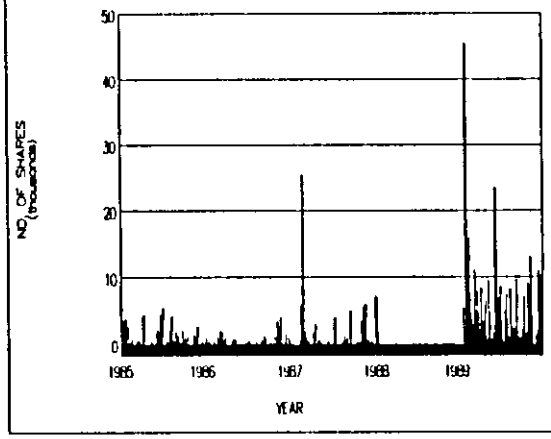
SHARE PRICE DEVELOPMENT (1985 - 1989)

AMMAN BANK FOR INVESTMENT



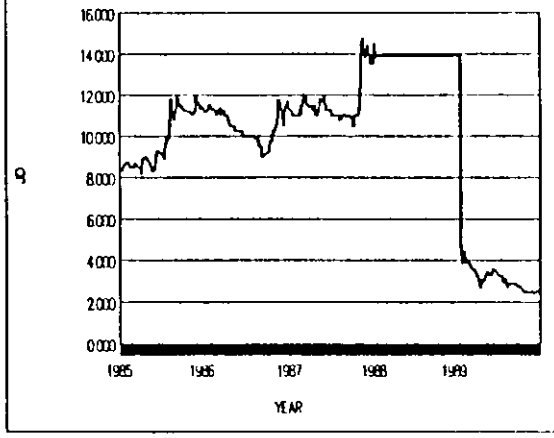
NO. OF SHARES TRADED (1985 - 1989)

JORDAN INSURANCE



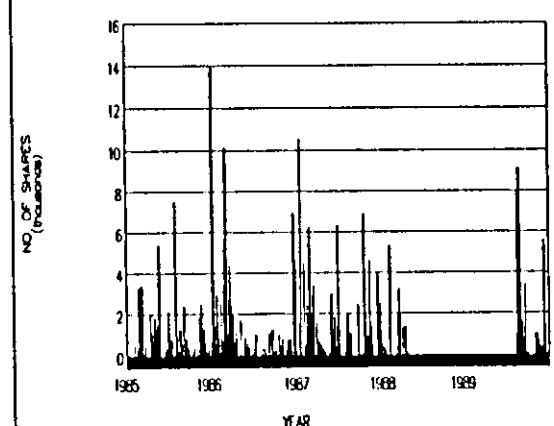
SHARE PRICE DEVELOPMENT (1985 - 1989)

JORDAN INSURANCE



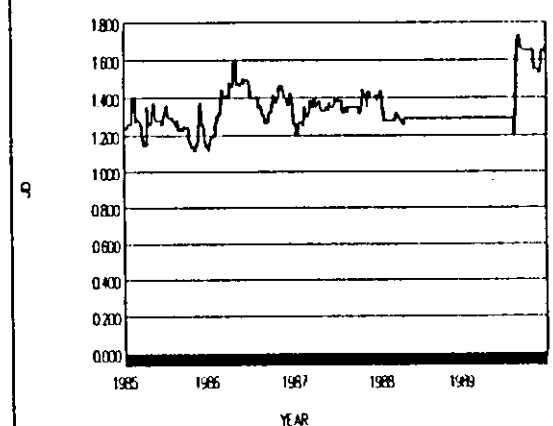
NO. OF SHARES TRADED (1985 - 1989)

JERUSALEM INSURANCE



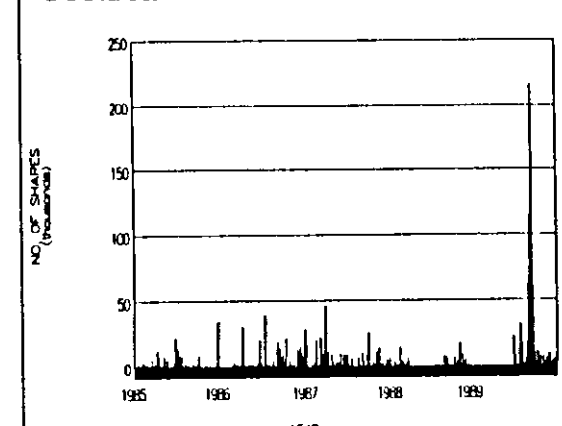
SHARE PRICE DEVELOPMENT (1985 - 1989)

JERUSALEM INSURANCE



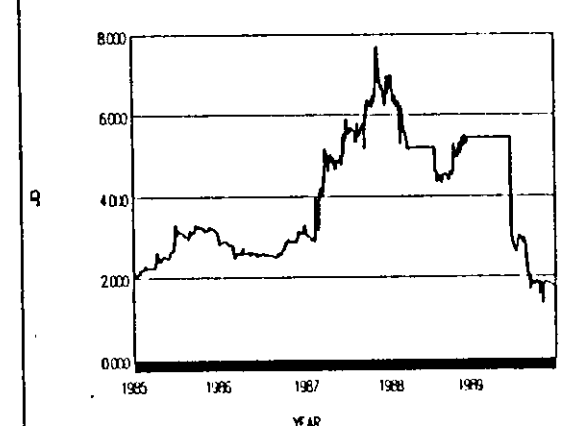
NO. OF SHARES TRADED (1985 - 1989)

JORDAN FRENCH INSURANCE



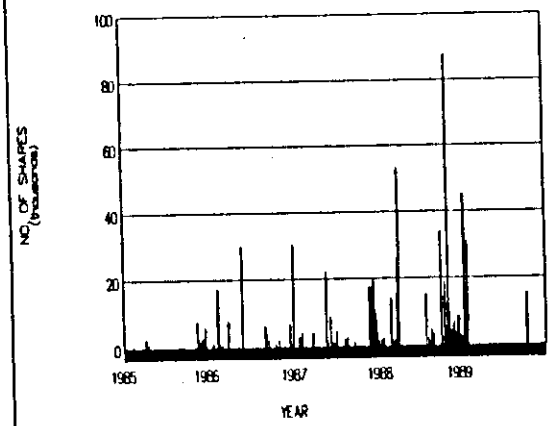
SHARE PRICE DEVELOPMENT (1985 - 1989)

JORDAN FRENCH INSURANCE



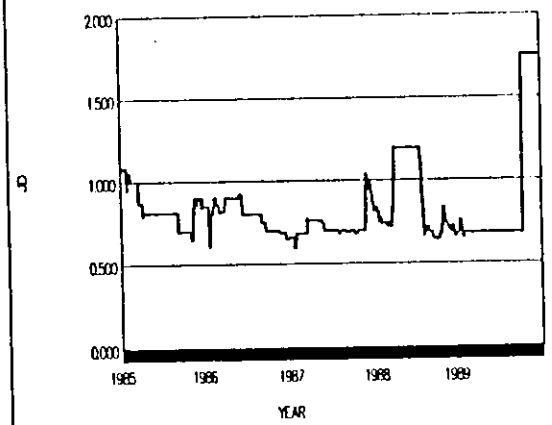
NO. OF SHARES TRADED (1985 - 1989)

UNIVERSAL INSURANCE



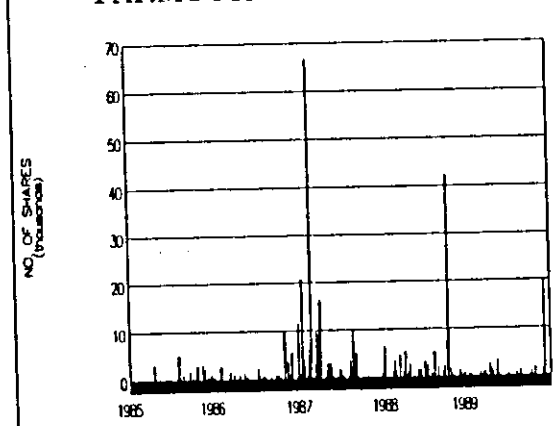
SHARE PRICE DEVELOPMENT (1985 - 1989)

UNIVERSAL INSURANCE



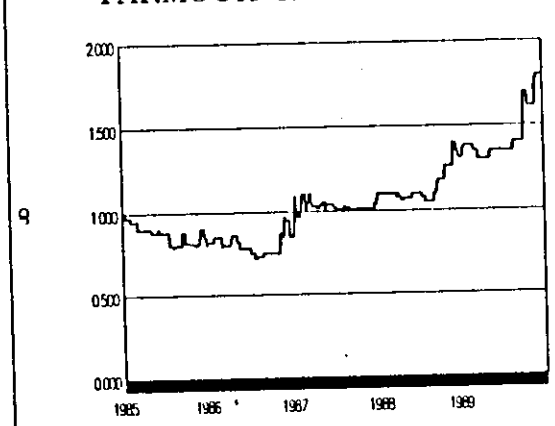
NO. OF SHARES TRADED (1985 - 1989)

YARMOUK INSURANCE



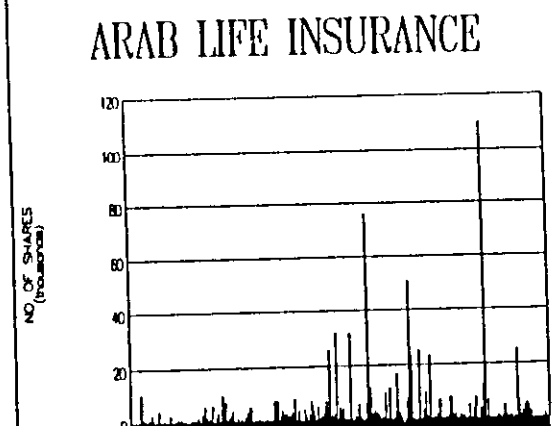
SHARE PRICE DEVELOPMENT (1985 - 1989)

YARMOUK INSURANCE



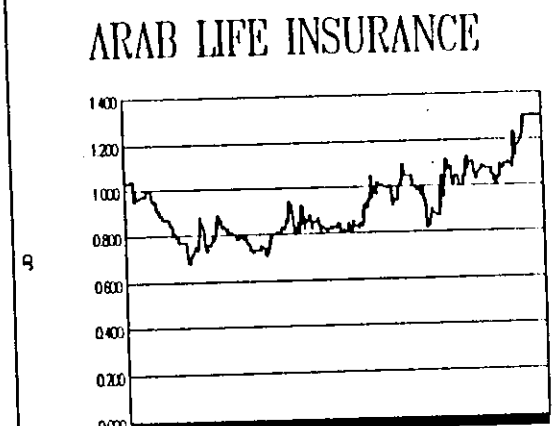
NO. OF SHARES TRADED (1985 - 1989)

ARAB LIFE INSURANCE



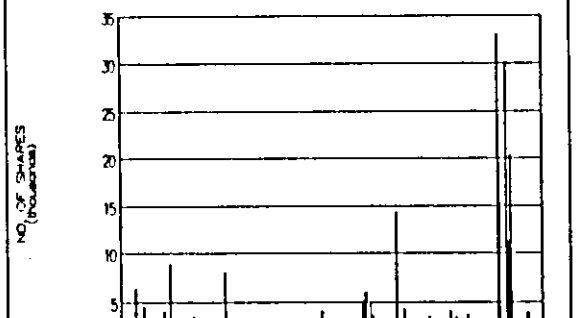
SHARE PRICE DEVELOPMENT (1985 - 1989)

ARAB LIFE INSURANCE



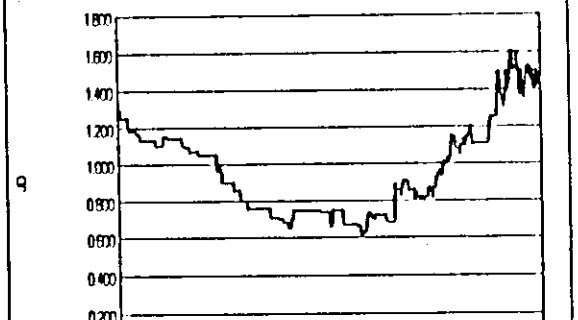
NO. OF SHARES TRADED (1985 - 1989)

PHILADELPHIA INSURANCE



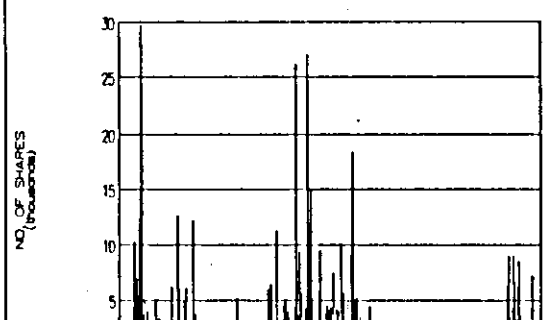
SHARE PRICE DEVELOPMENT (1985 - 1989)

PHILADELPHIA INSURANCE



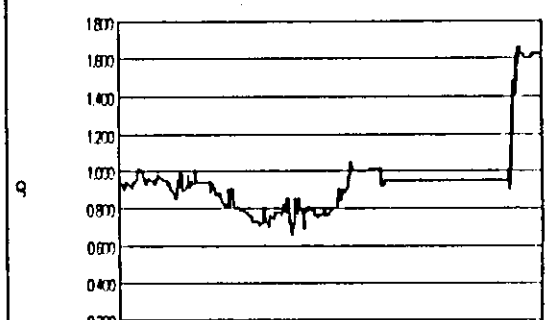
NO. OF SHARES TRADED (1985 - 1989)

JORDAN GULF INSURANCE



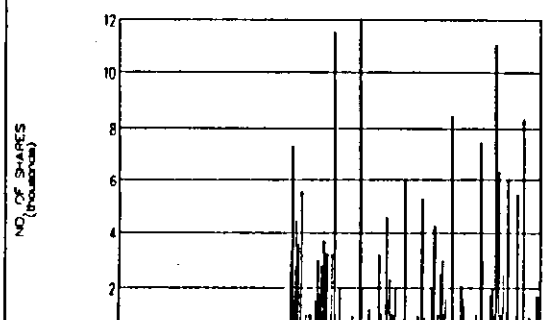
SHARE PRICE DEVELOPMENT (1985 - 1989)

JORDAN GULF INSURANCE



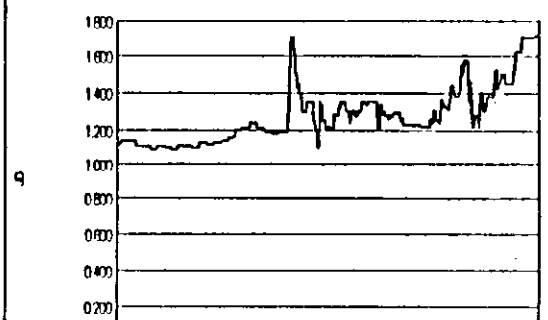
NO. OF SHARES TRADED (1985 - 1989)

NATIONAL AHLIA INSURANCE



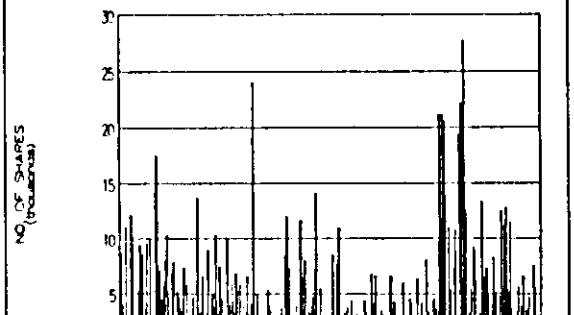
SHARE PRICE DEVELOPMENT (1985 - 1989)

NATIONAL AHLIA INSURANCE



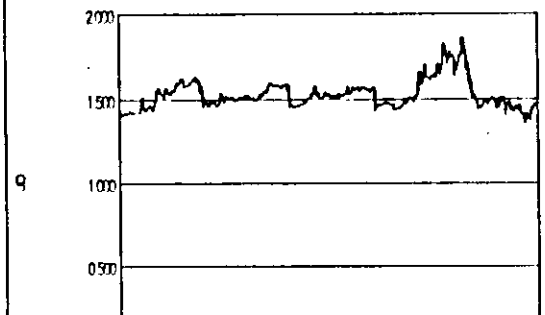
NO. OF SHARES TRADED (1985 - 1989)

JORDAN ELECTRIC POWER



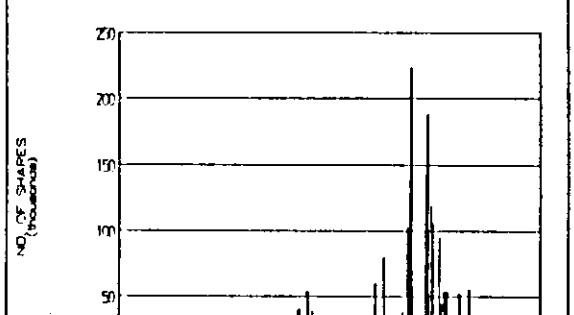
SHARE PRICE DEVELOPMENT (1985 - 1989)

JORDAN ELECTRIC POWER



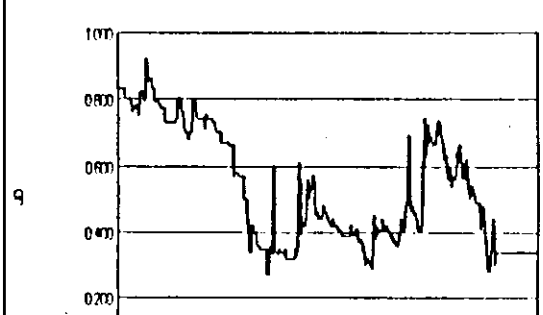
NO. OF SHARES TRADED (1985 - 1989)

DAR AL-SHA'AB PRINTING



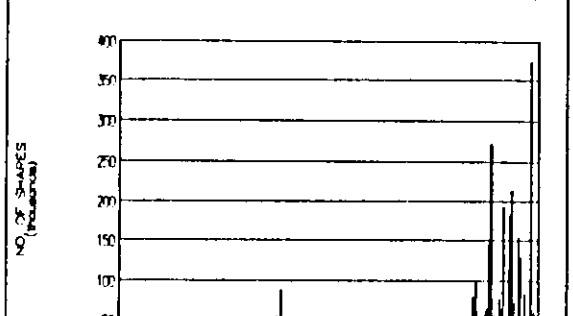
SHARE PRICE DEVELOPMENT (1985 - 1989)

DAR AL-SHA'AB PRINTING



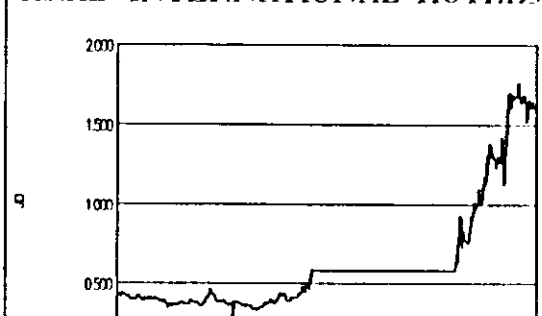
NO. OF SHARES TRADED (1985 - 1989)

ARAB INTERNATIONAL HOTELS



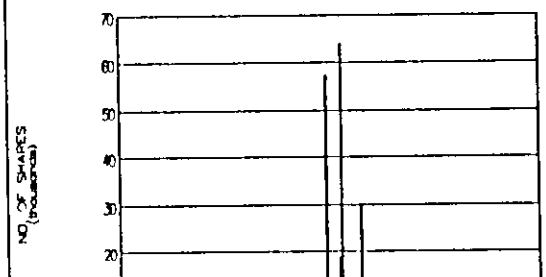
SHARE PRICE DEVELOPMENT (1985 - 1989)

ARAB INTERNATIONAL HOTELS



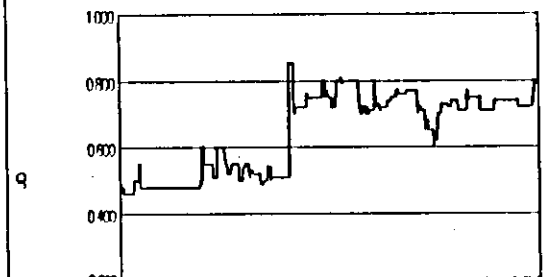
NO. OF SHARES TRADED (1985 - 1989)

LIVESTOCK AND POULTRY



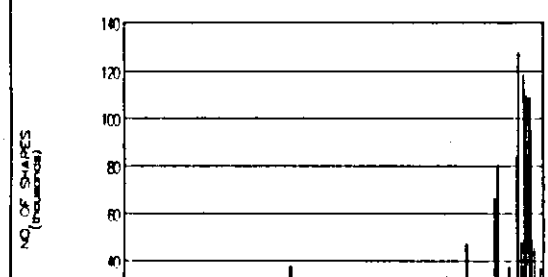
SHARE PRICE DEVELOPMENT (1985 - 1989)

LIVESTOCK AND POULTRY



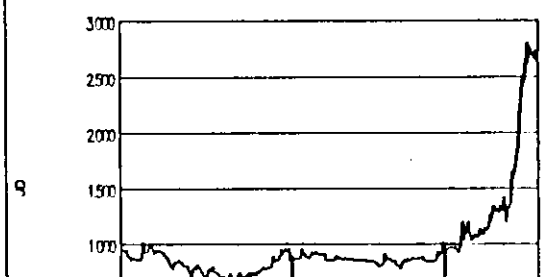
NO. OF SHARES TRADED (1985 - 1989)

JORDAN NATIONAL SHIPPING



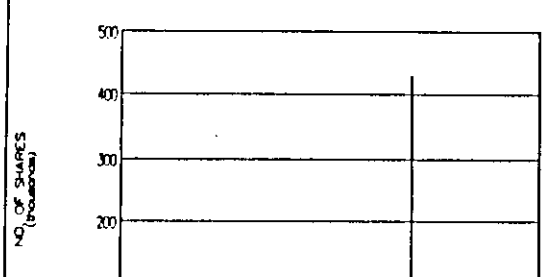
SHARE PRICE DEVELOPMENT (1985 - 1989)

JORDAN NATIONAL SHIPPING



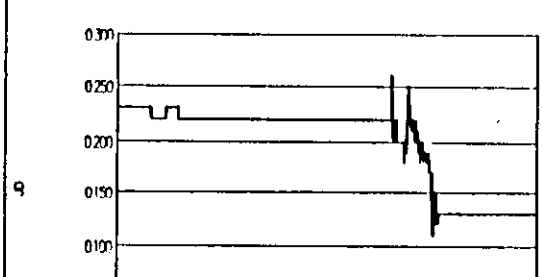
NO. OF SHARES TRADED (1985 - 1989)

INTERNATIONAL CONTRACTING



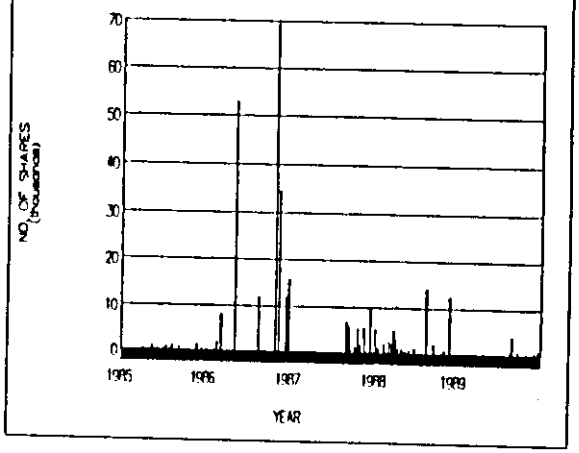
SHARE PRICE DEVELOPMENT (1985 - 1989)

INTERNATIONAL CONTRACTING



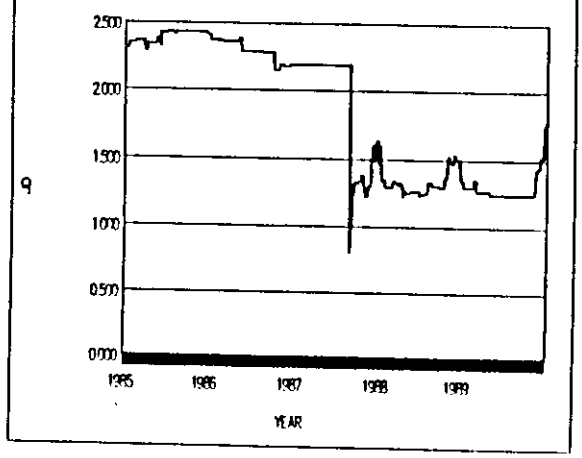
NO. OF SHARES TRADED (1985 - 1989)

GENERAL INVESTMENT



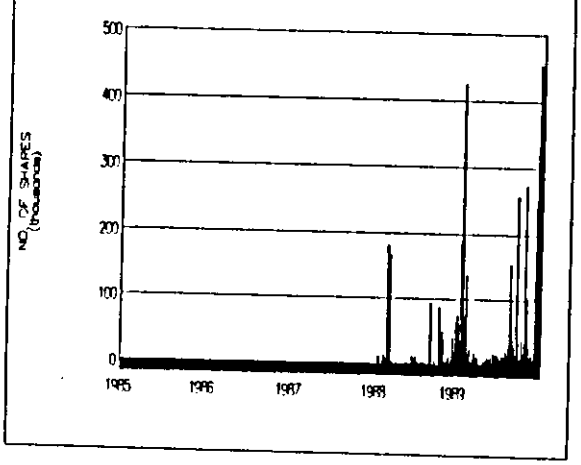
SHARE PRICE DEVELOPMENT (1985 - 1989)

GENERAL INVESTMENT



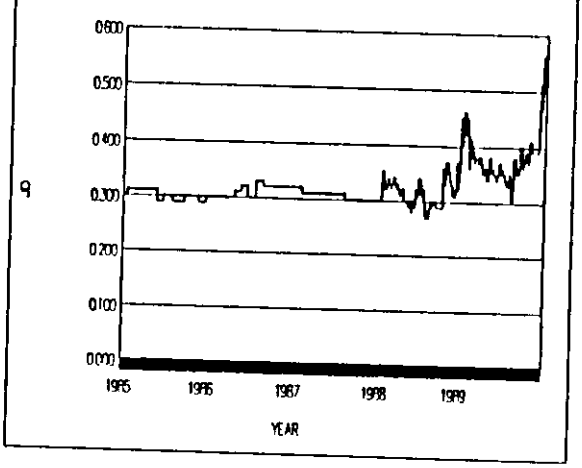
NO. OF SHARES TRADED (1985 - 1989)

JORDAN GULF REAL ESTATE



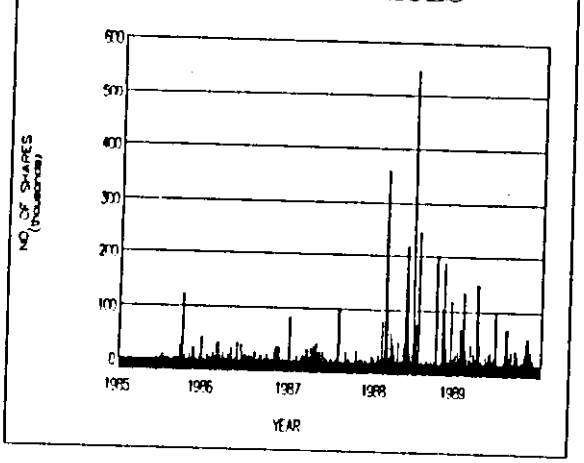
SHARE PRICE DEVELOPMENT (1985 - 1989)

JORDAN GULF REAL ESTATE



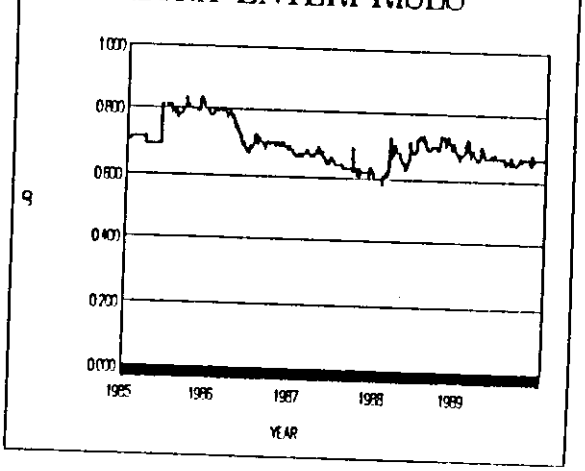
NO. OF SHARES TRADED (1985 - 1989)

PETRA ENTERPRISES



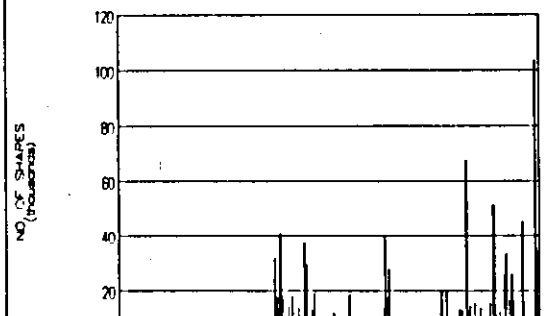
SHARE PRICE DEVELOPMENT (1985 - 1989)

PETRA ENTERPRISES



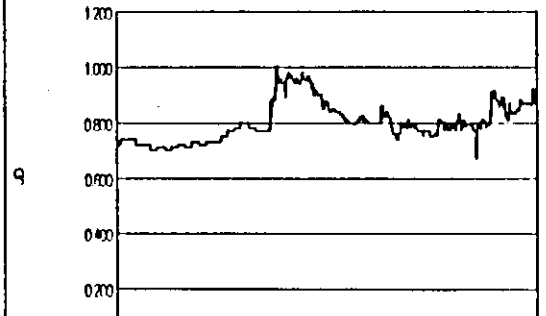
NO. OF SHARES TRADED (1985 - 1989)

MACHINARY EQUP. RENTING



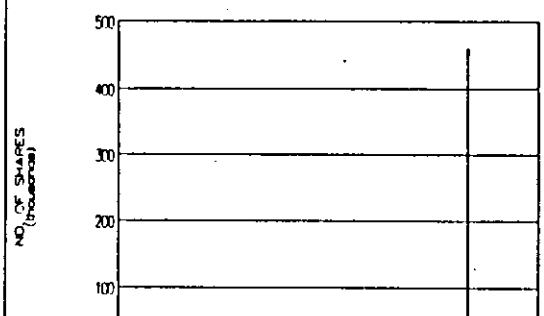
SHARE PRICE DEVELOPMENT (1985 - 1989)

MACHINARY EQUP. RENTING



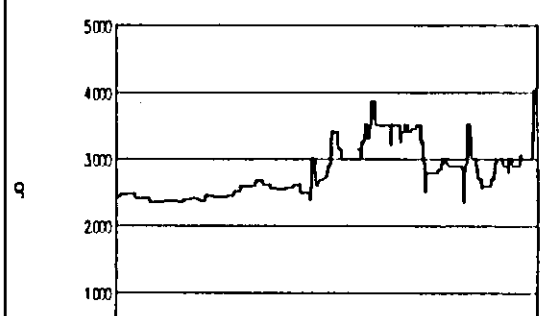
NO. OF SHARES TRADED (1985 - 1989)

AL-RAI



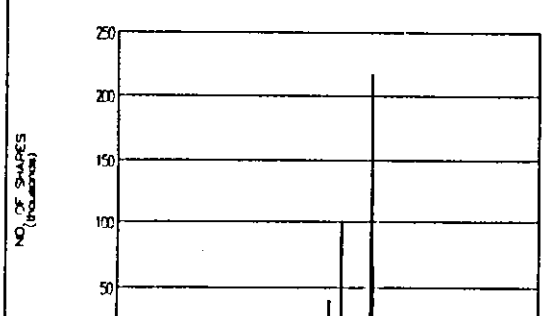
SHARE PRICE DEVELOPMENT (1985 - 1989)

AL-RAI



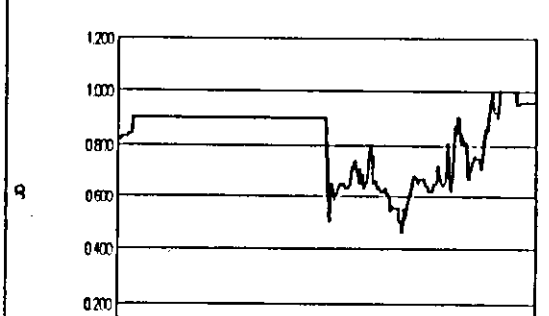
NO. OF SHARES TRADED (1985 - 1989)

INMA INVESTMENT



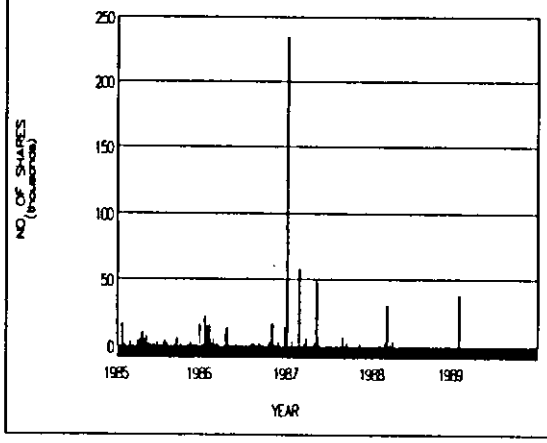
SHARE PRICE DEVELOPMENT (1985 - 1989)

INMA INVESTMENT



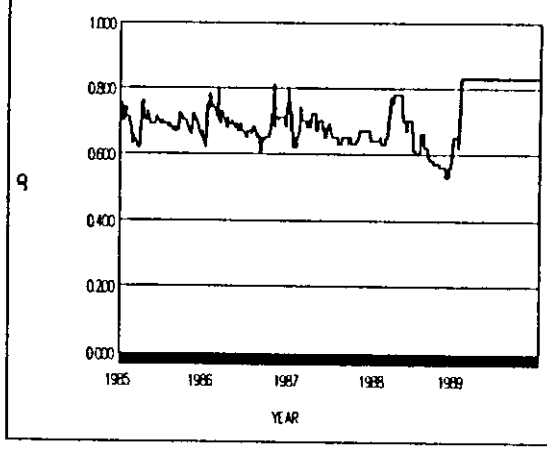
NO. OF SHARES TRADED (1985 - 1989)

JORDAN MACHINERY



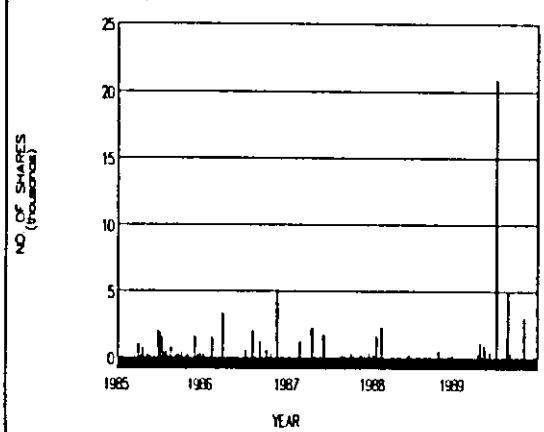
SHARE PRICE DEVELOPMENT (1985 - 1989)

JORDAN MACHINERY



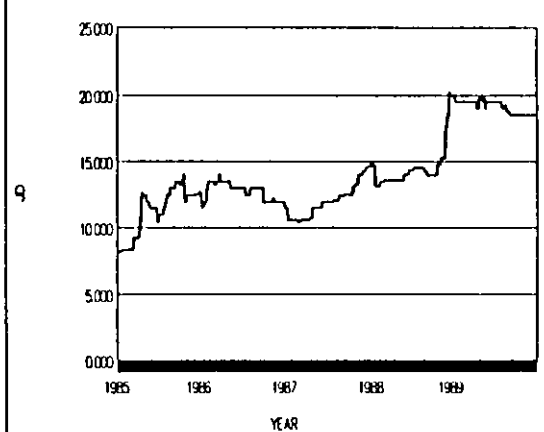
NO. OF SHARES TRADED (1985 - 1989)

JORDAN TABACCO



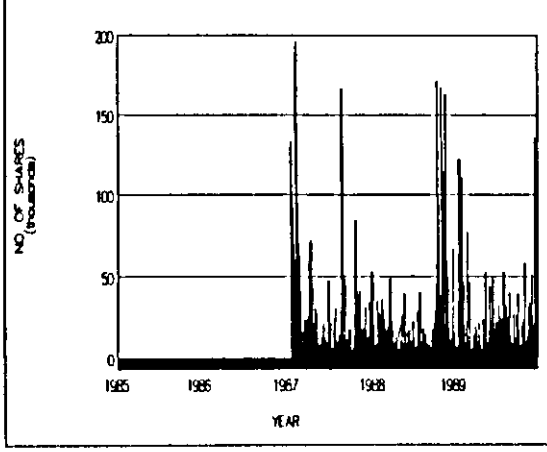
SHARE PRICE DEVELOPMENT (1985 - 1989)

JORDAN TABACCO



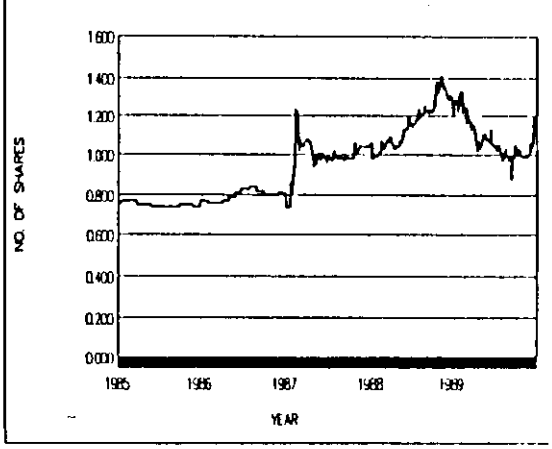
NO. OF SHARES TRADED (1985 - 1989)

JORDAN CEMENT FACTORIES



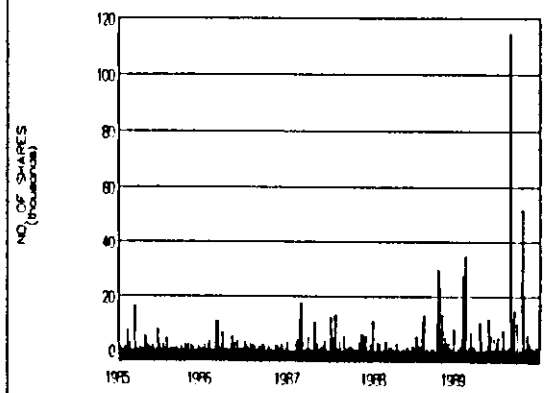
SHARE PRICE DEVELOPMENT (1985 - 1989)

JORDAN CEMENT FACTORIES



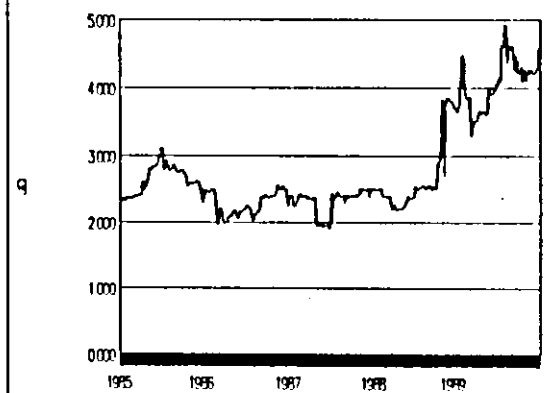
NO. OF SHARES TRADED (1985 - 1989)

JORDAN PHOSPHATE MINES



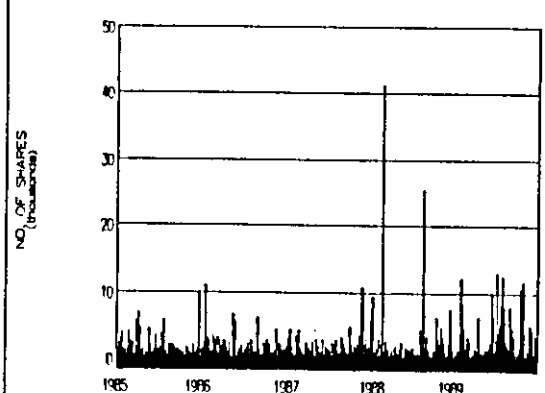
SHARE PRICE DEVELOPMENT (1985 - 1989)

JORDAN PHOSPHATE MINES



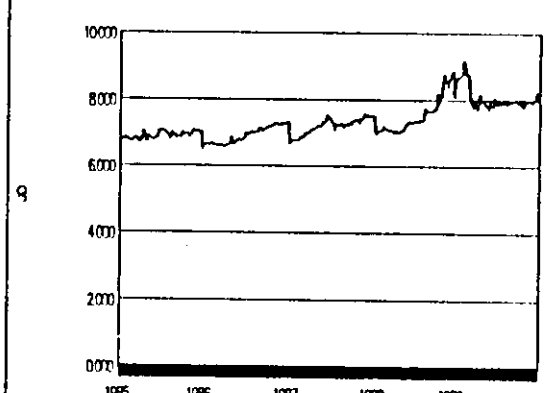
NO. OF SHARES TRADED (1985 - 1989)

JORDAN PETROLEUM REFINARY



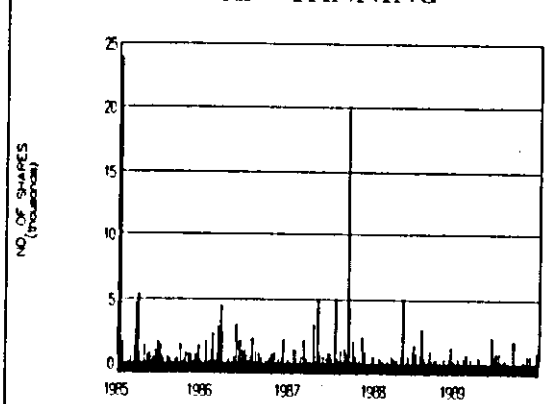
SHARE PRICE DEVELOPMENT (1985 - 1989)

JORDAN PETROLEUM REFINARY



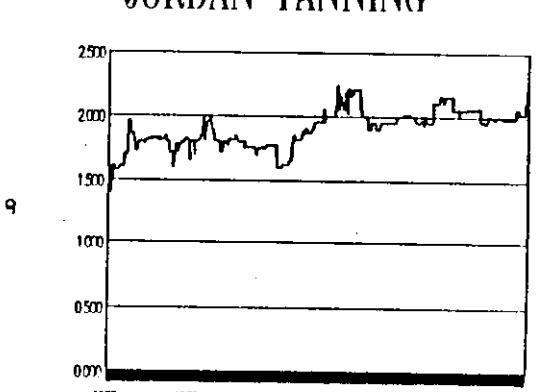
NO. OF SHARES TRADED (1985 - 1989)

JORDAN TANNING



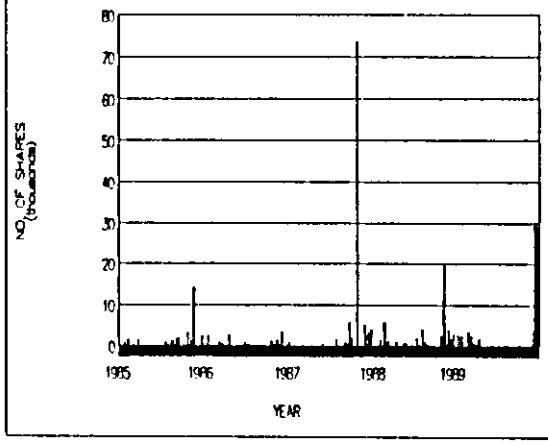
SHARE PRICE DEVELOPMENT (1985 - 1989)

JORDAN TANNING



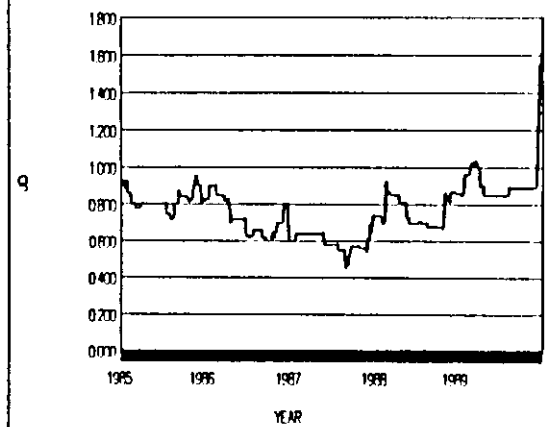
NO. OF SHARES TRADED (1985 - 1989)

WOOLEN INDUSTRIES



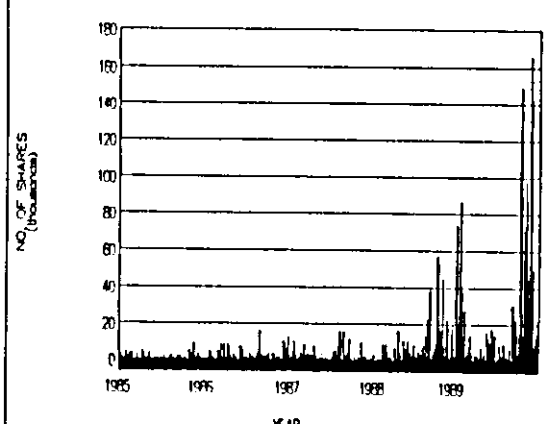
SHARE PRICE DEVELOPMENT (1985 - 1989)

WOOLEN INDUSTRIES



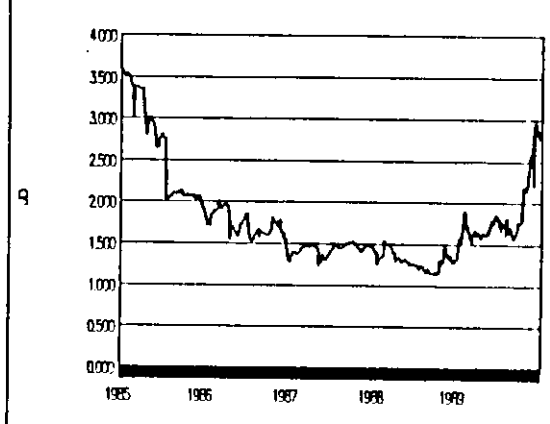
NO. OF SHARES TRADED (1985 - 1989)

THE INDUSTRIAL COMMERCIAL



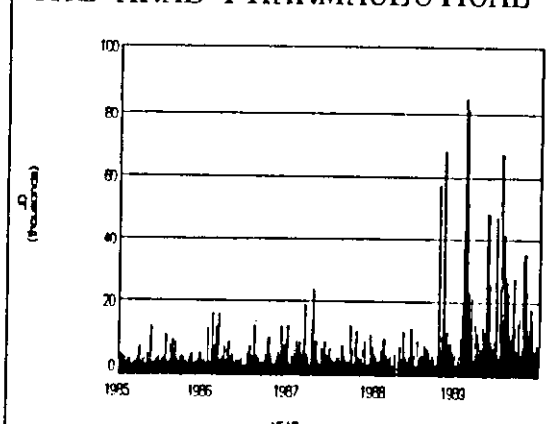
SHARE PRICE DEVELOPMENT (1985 - 1989)

THE INDUSTRIAL COMMERCIAL



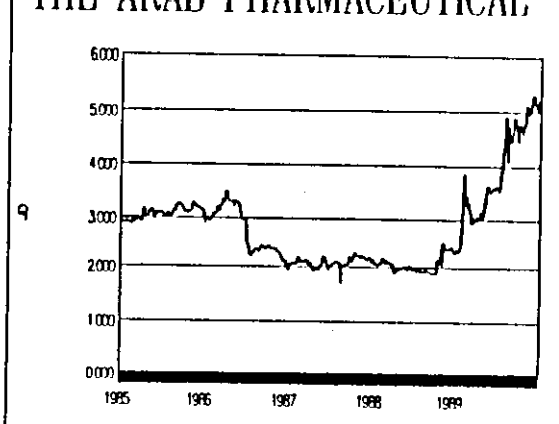
SHARE PRICE DEVELOPMENT (1985 - 1989)

THE ARAB PHARMACEUTICAL



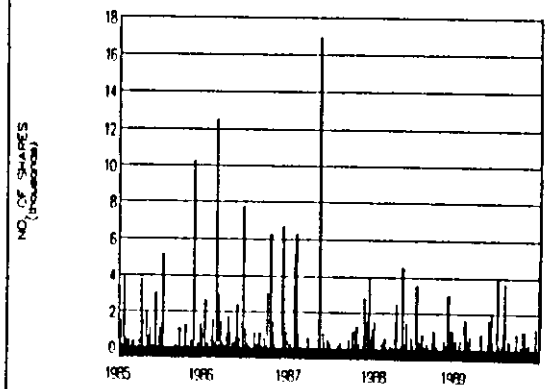
SHARE PRICE DEVELOPMENT (1985 - 1989)

THE ARAB PHARMACEUTICAL



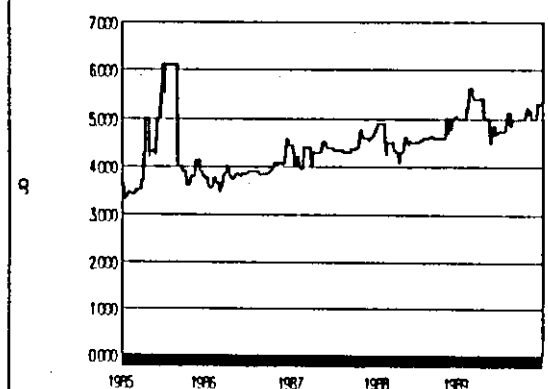
NO. OF SHARES TRADED (1985 - 1989)

JORDAN WORSTED MILLS



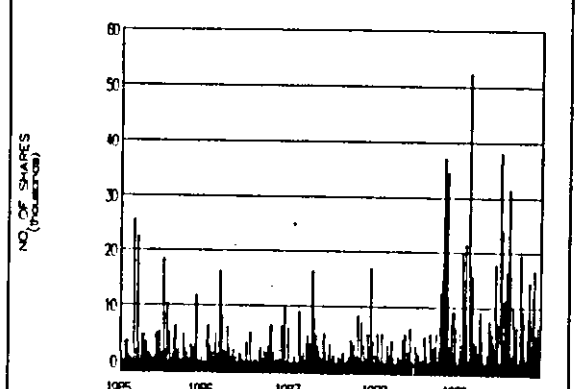
SHARE PRICE DEVELOPMENT (1985 - 1989)

JORDAN WORSTED MILLS



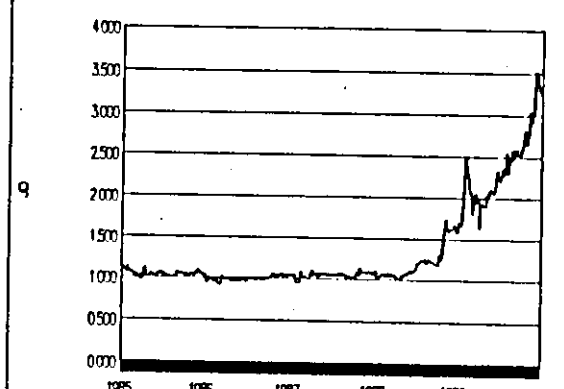
NO. OF SHARES TRADED (1985 - 1989)

JORDAN CERAMIC



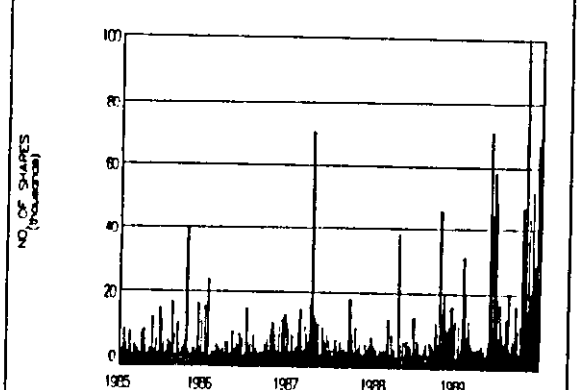
SHARE PRICE DEVELOPMENT (1985 - 1989)

JORDAN CERAMIC



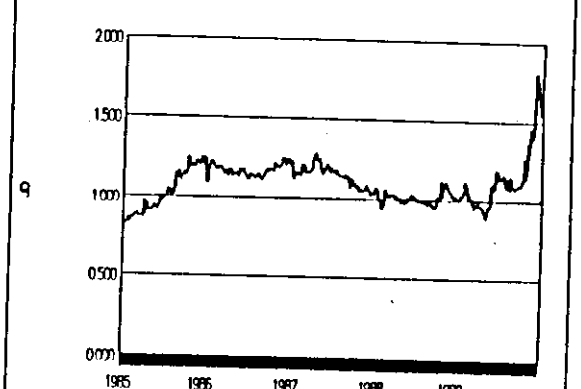
NO. OF SHARES TRAEDED (1985 - 1989)

JORDAN DIARY



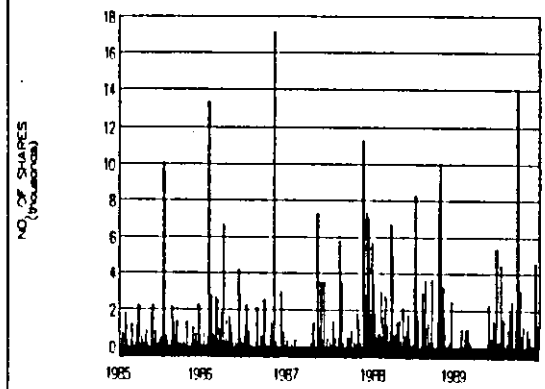
SHARE PRICE DEVELOPMENT (1985 - 1989)

JORDAN DIARY



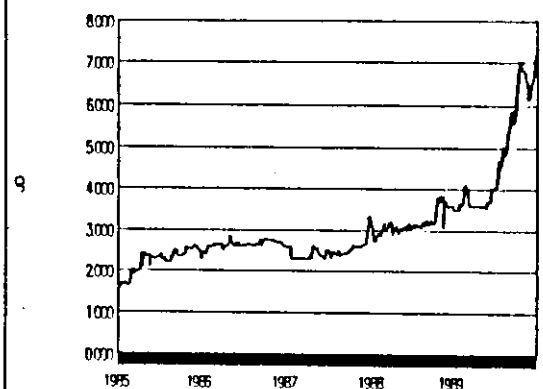
NO. OF SHARES TRADED (1985 - 1989)

PAPER & CARDBOARD



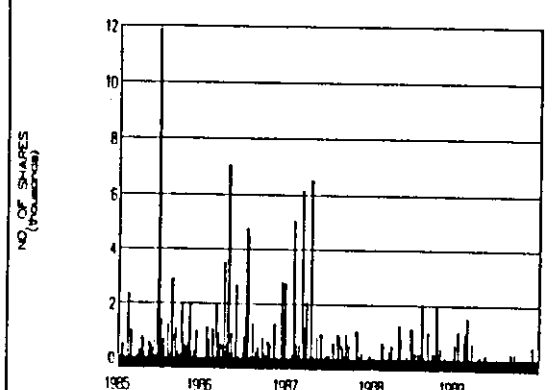
SHARE PRICE DEVELOPMENT (1985 - 1989)

PAPER & CARDBOARD



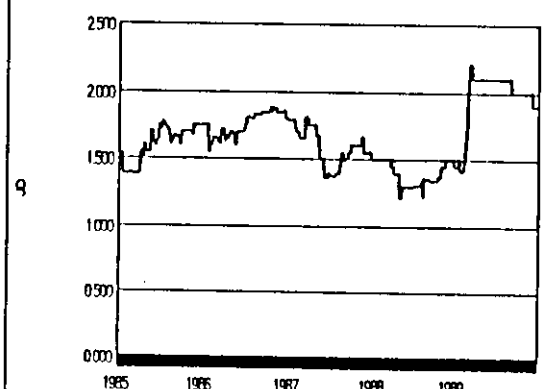
NO. OF SHARES TRADED (1985 - 1989)

THE PUBLIC MINING



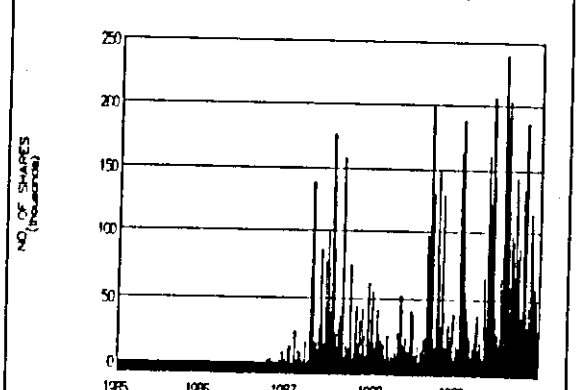
SHARE PRICE DEVELOPMENT (1985 - 1989)

THE PUBLIC MINING



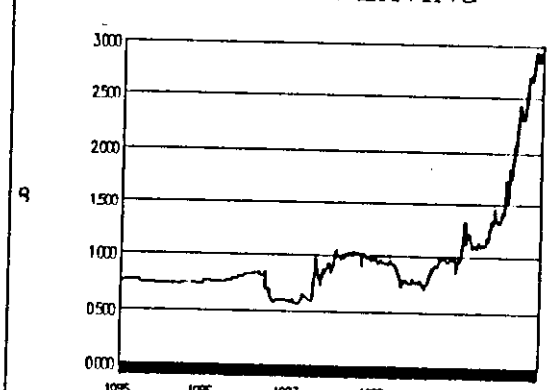
NO. OF SHARES TRADED (1985 - 1989)

SPINNING & WEAVING



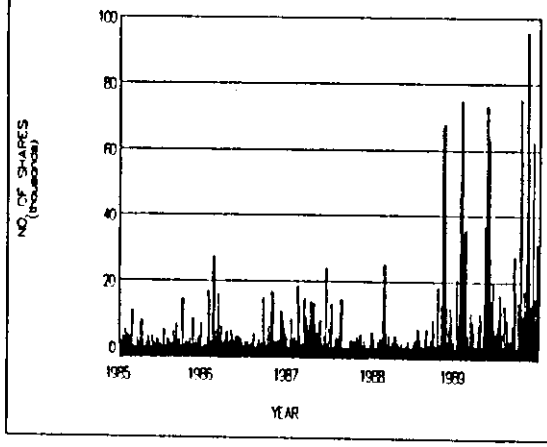
SHARE PRICE DEVELOPMENT (1985 - 1989)

SPINNING & WEAVING



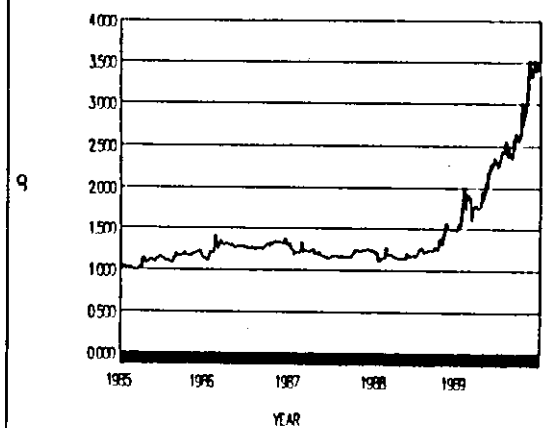
NO. OF SHARES TRADED (1985 - 1989)

PIPES MANUFACTURING



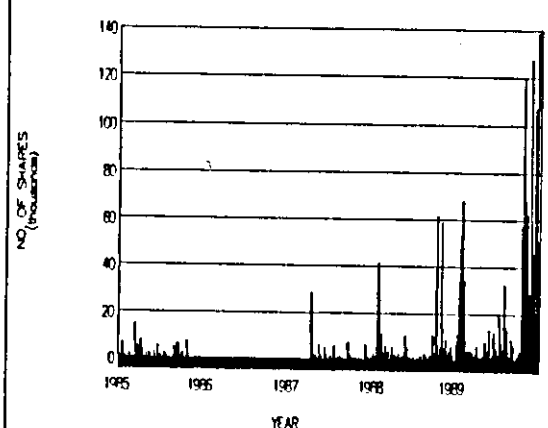
SHARE PRICE DEVELOPMENT (1985 - 1989)

PIPES MANUFACTURING



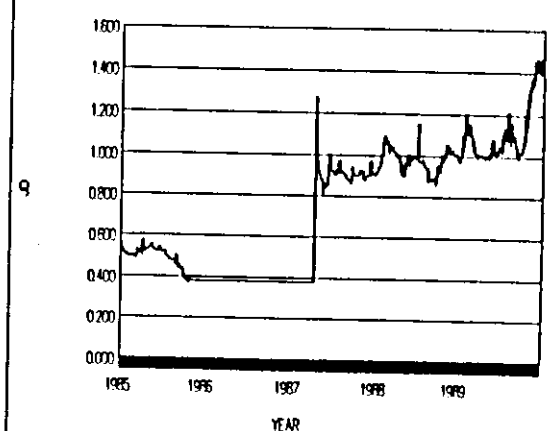
NO. OF SHARES TRADED (1985 - 1989)

GLASS INDUSTRIES



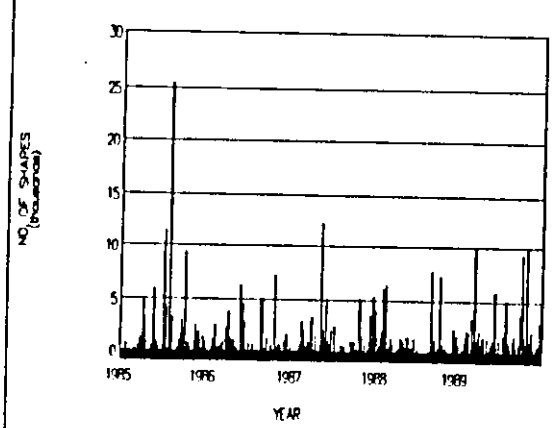
SHARE PRICE DEVELOPMENT (1985 - 1989)

GLASS INDUSTRIES



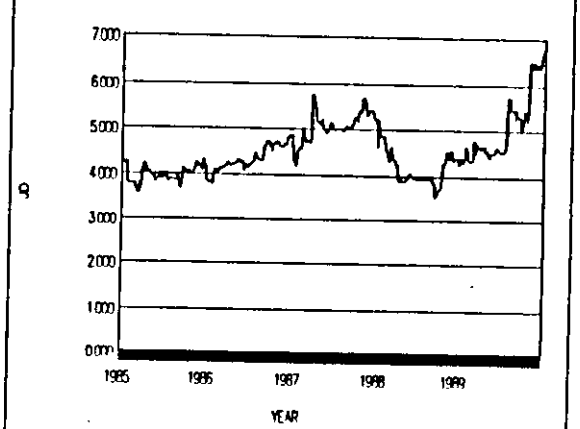
NO. OF SHARES TRADED (1985 - 1989)

ARAB CHEMICAL DETERGENTS



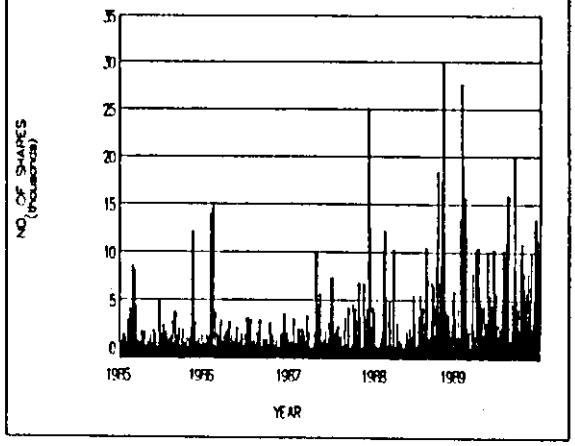
SHARE PRICE DEVELOPMENT (1985 - 1989)

ARAB CHEMICAL DETERGENTS



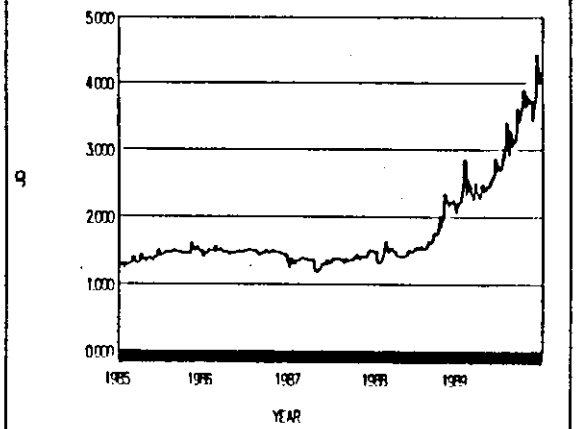
NO. OF SHARES TRADED (1985 - 1989)

DAR AL DAWA



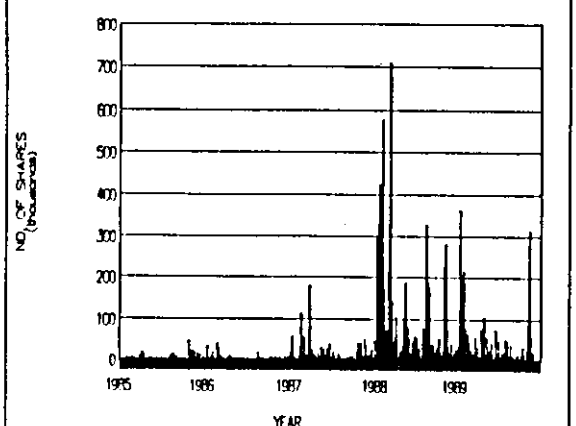
SHARE PRICE DEVELOPMENT (1985 - 1989)

DAR AL DAWA



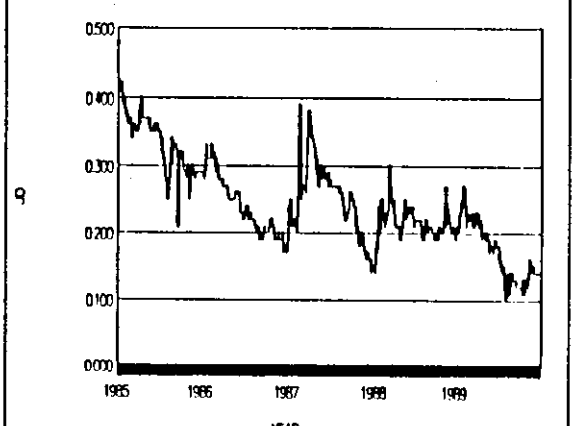
NO. OF SHARES TRADED (1985 - 1989)

LIME & SILICATE



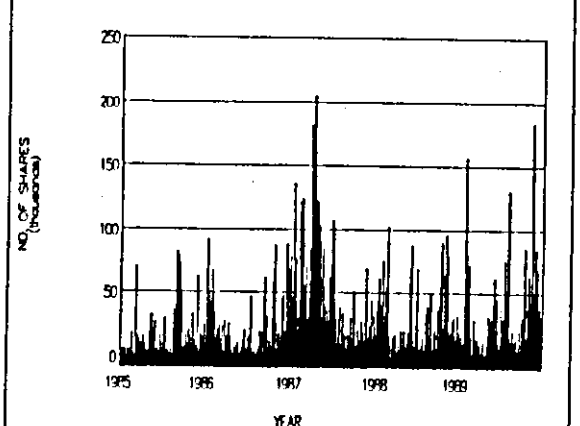
SHARE PRICE DEVELOPMENT (1985 - 1989)

LIME & SILICATE



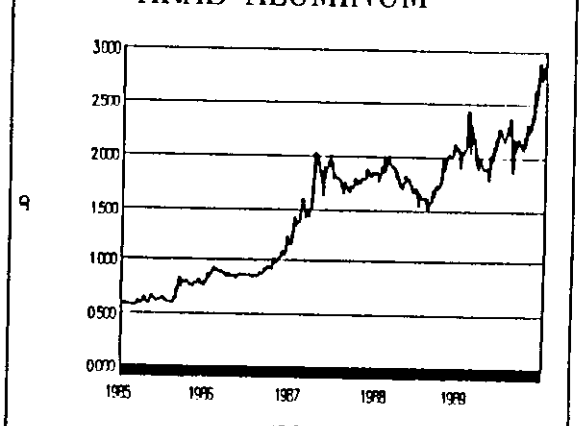
NO. OF SHARES TRADED (1985 - 1989)

ARAB ALUMINUM



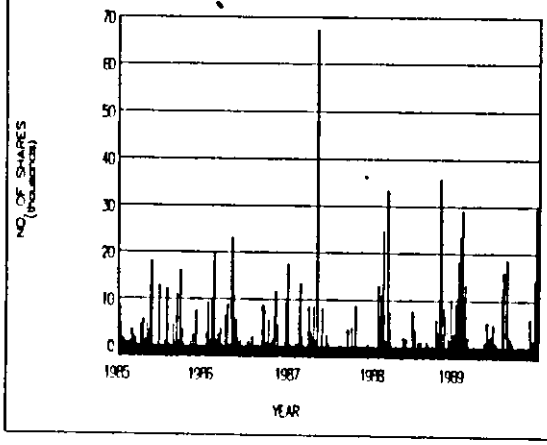
SHARE PRICE DEVELOPMENT (1985 - 1989)

ARAB ALUMINUM



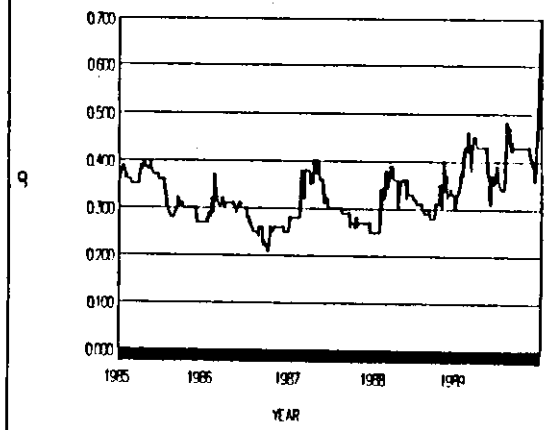
NO. OF SHARES TRADED (1985 - 1989)

PAPER CONVERTING



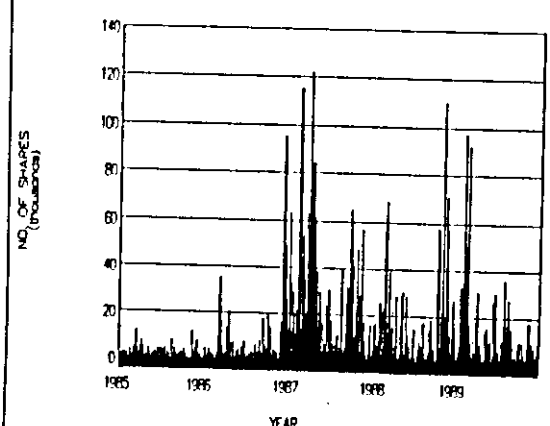
SHARE PRICE DEVELOPMENT (1985 - 1989)

PAPER CONVERTING



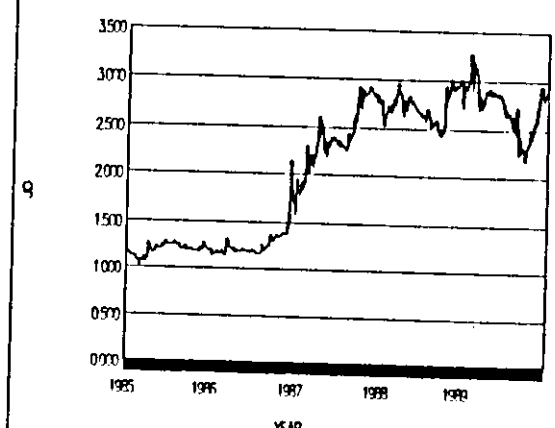
NO. OF SHARES TRADED (1985 - 1989)

STEEL INDUSTRY



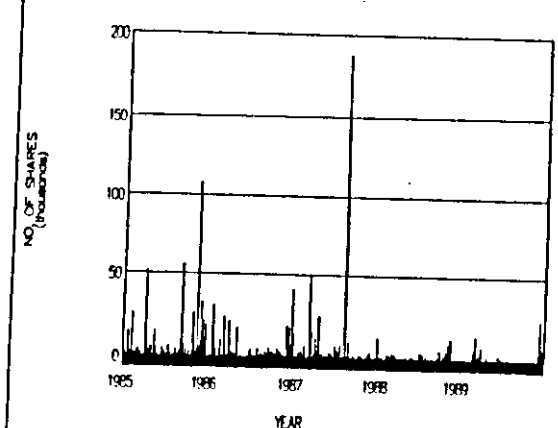
SHARE PRICE DEVELOPMENT (1985 - 1989)

STEEL INDUSTRY



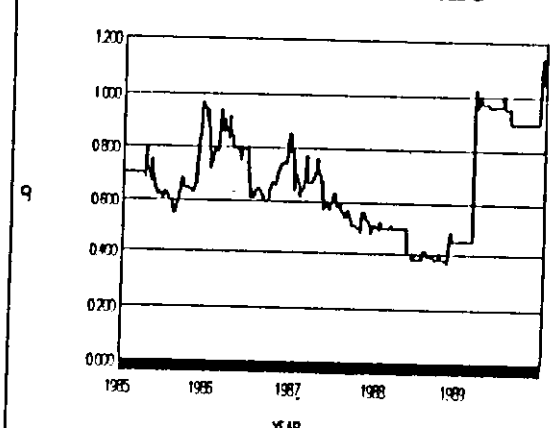
NO. OF SHARES TRADED (1985 - 1989)

NATIONAL INDUSTRIES



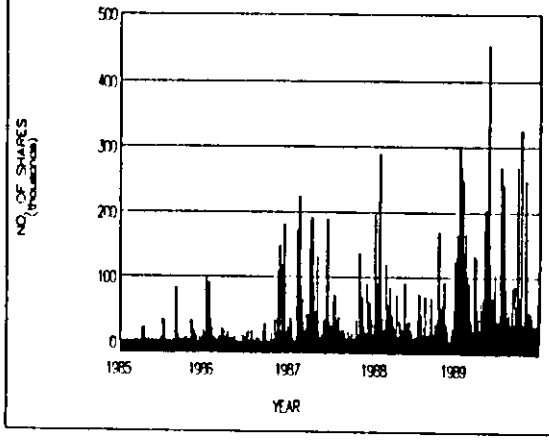
SHARE PRICE DEVELOPMENT (1985 - 1989)

NATIONAL INDUSTRIES



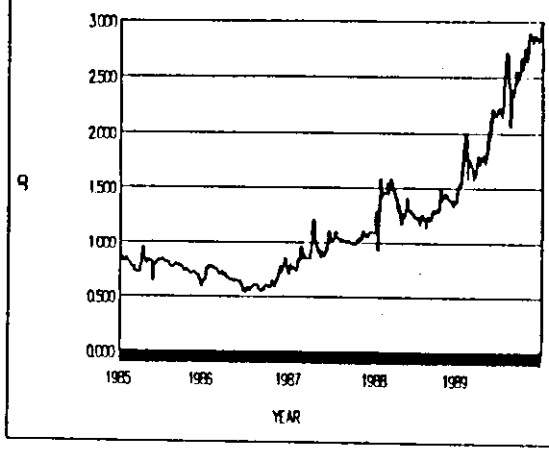
NO. OF SHARES TRADED (1985 - 1989)

PETRO - CHEMICAL



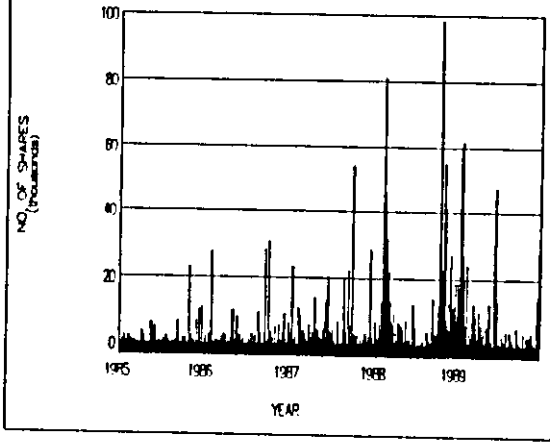
SHARE PRICE DEVELOPMENT (1985 - 1989)

PETRO - CHEMICAL



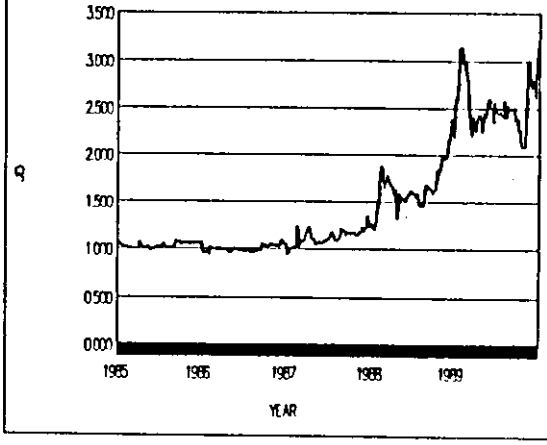
NO. OF SHARES TRADED (1985 - 1989)

JORDAN CHEMICAL



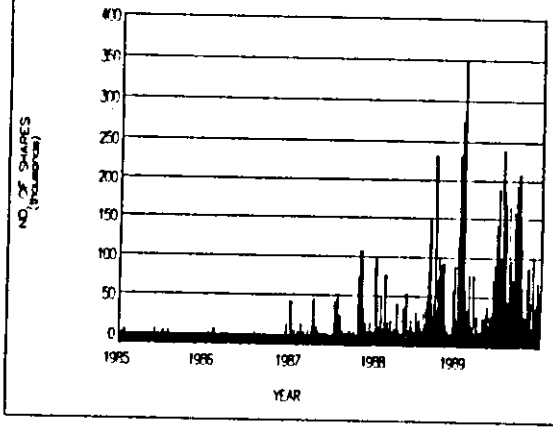
SHARE PRICE DEVELOPMENT (1985 - 1989)

JORDAN CHEMICAL



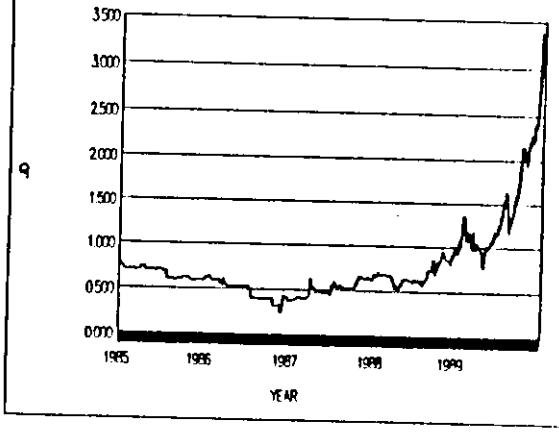
NO. OF SHARES TRADED (1985 - 1989)

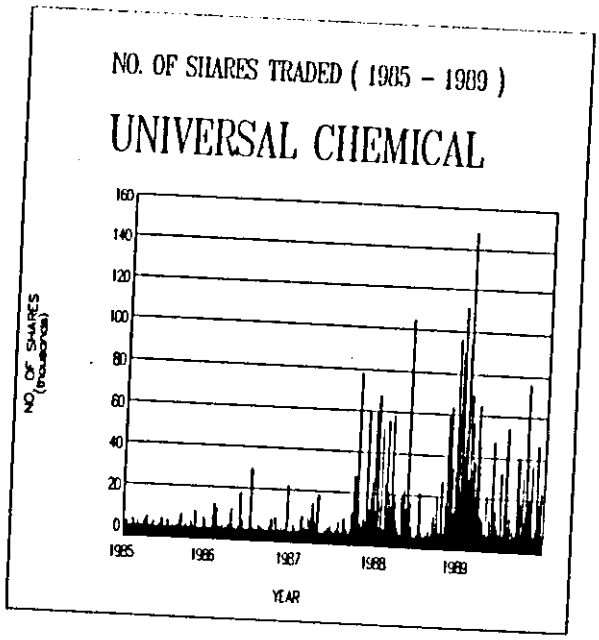
JORDAN ROCK WOOL

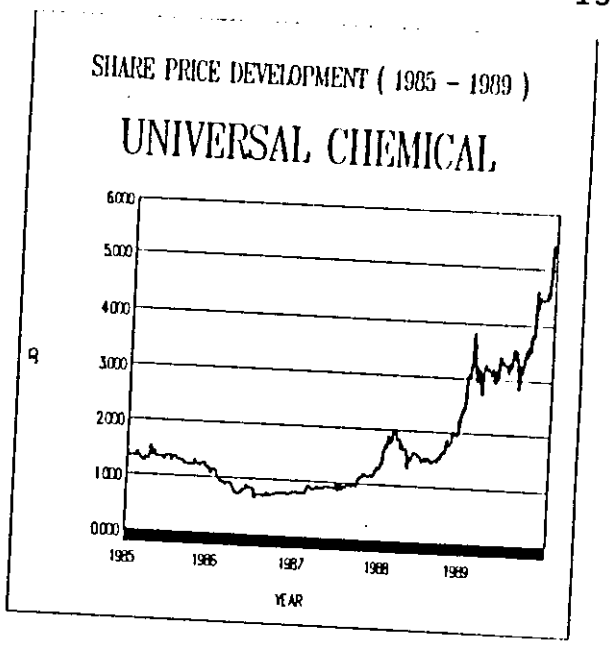


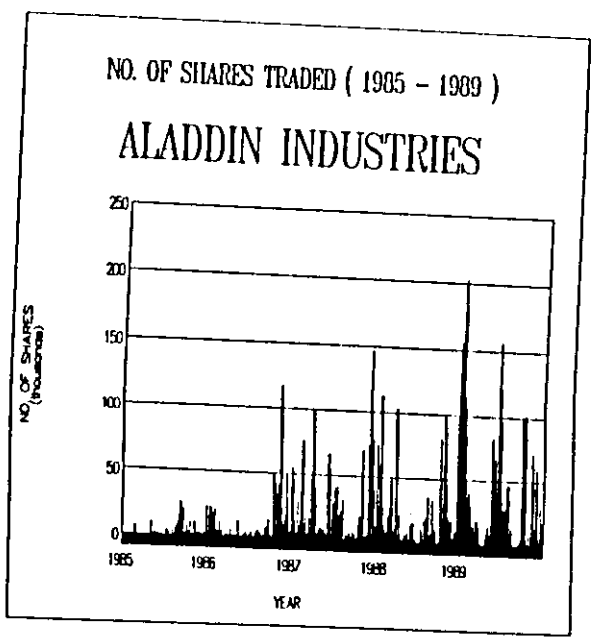
SHARE PRICE DEVELOPMENT (1985 - 1989)

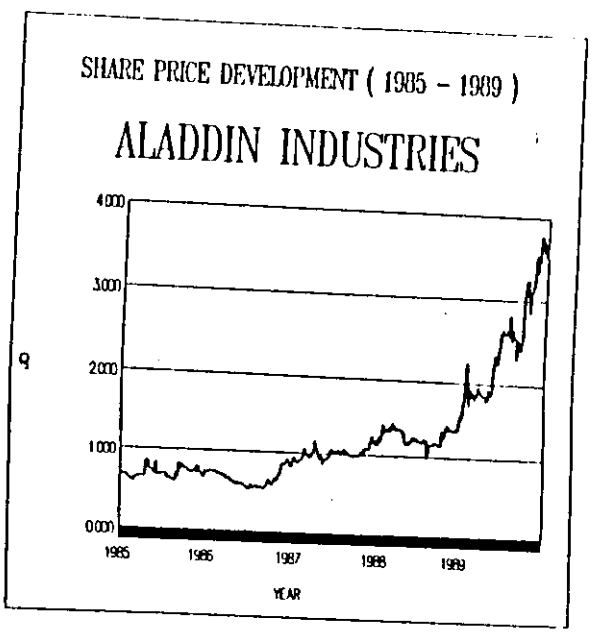
JORDAN ROCK WOOL

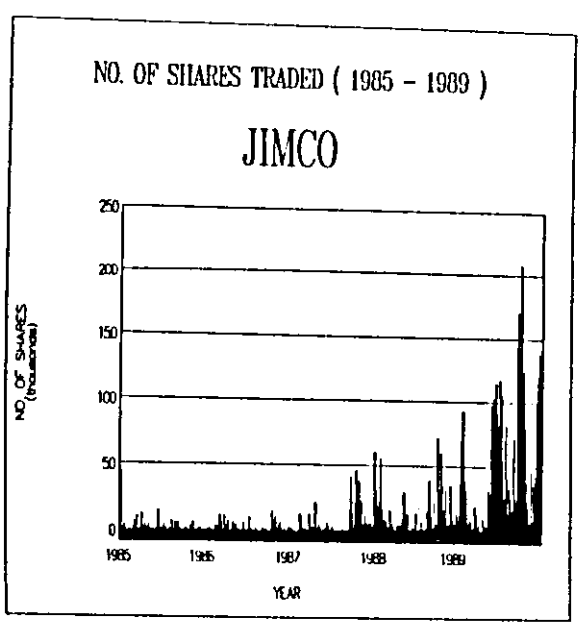


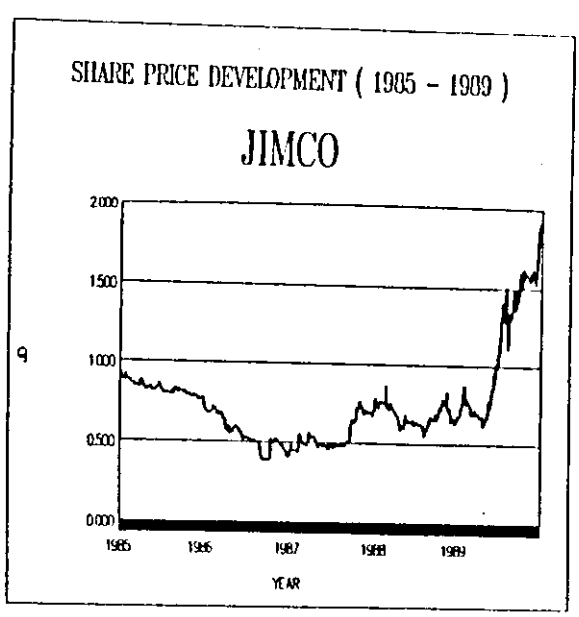


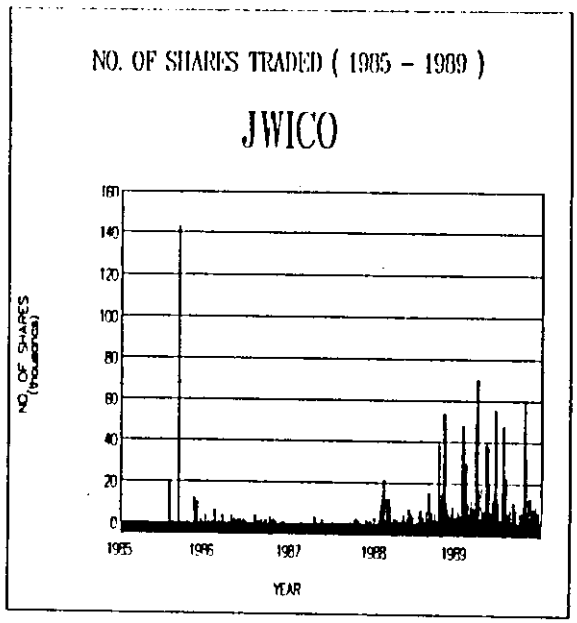


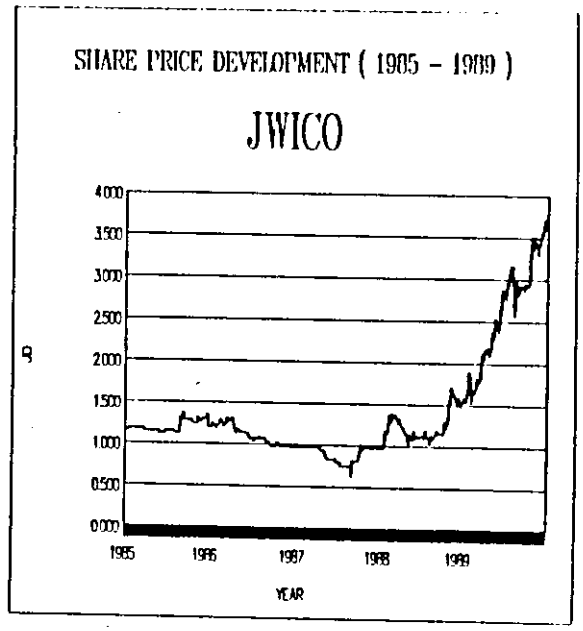


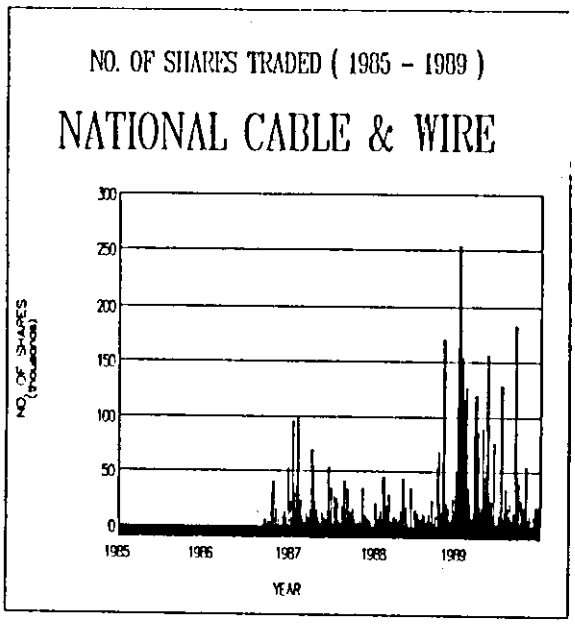


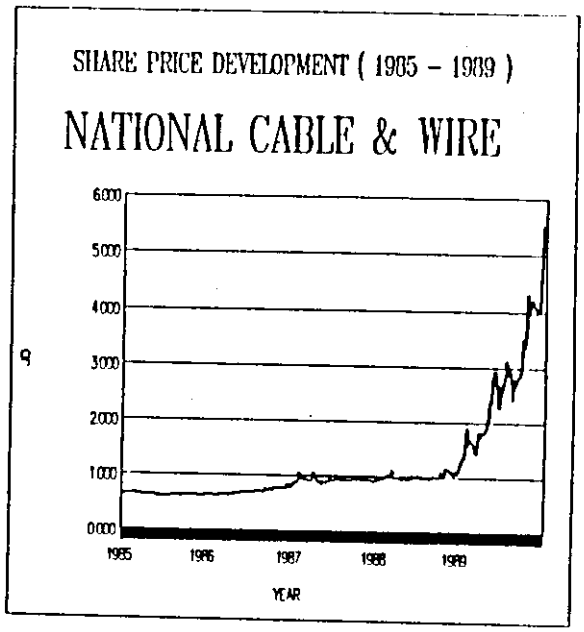


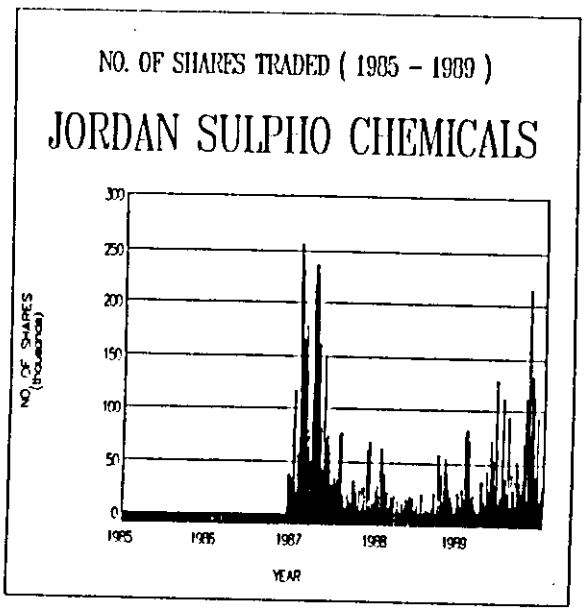


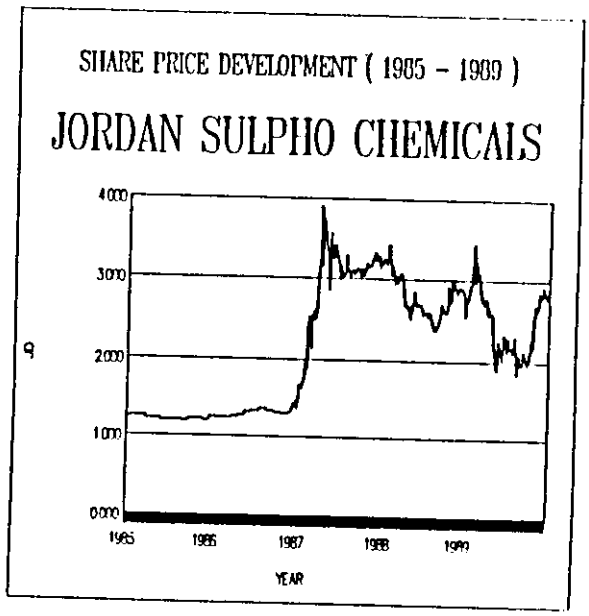


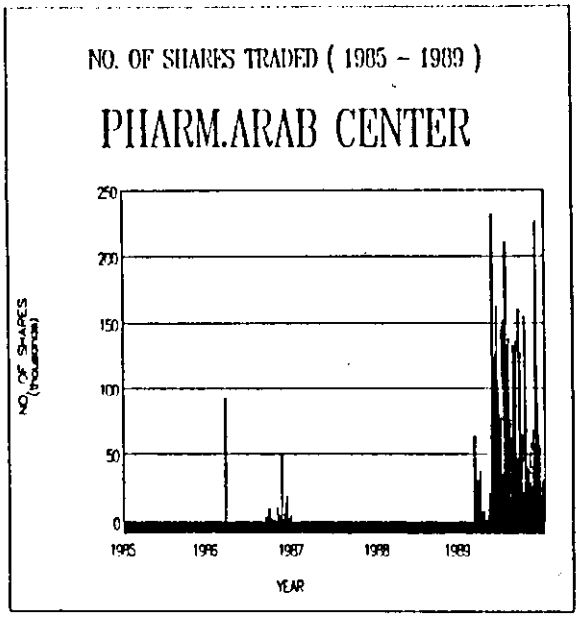


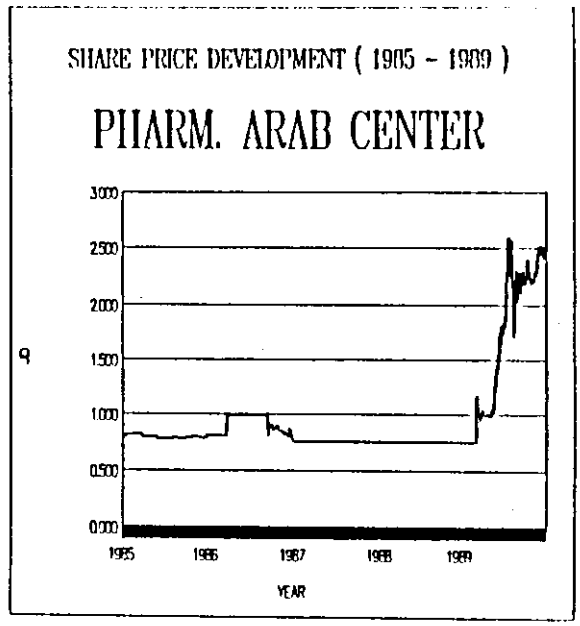








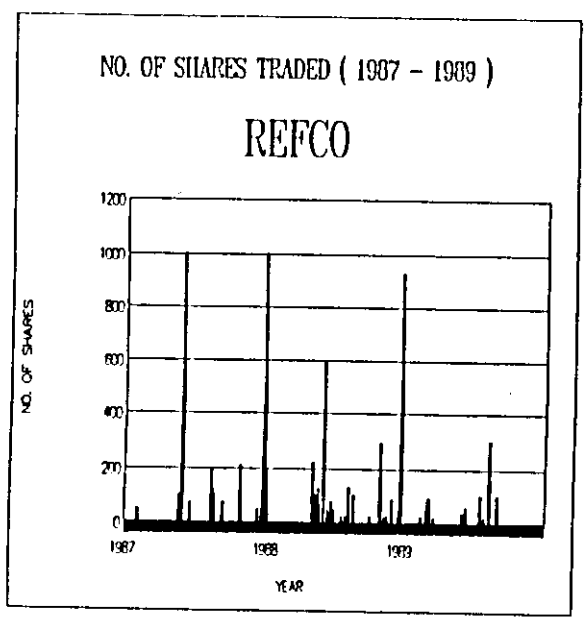


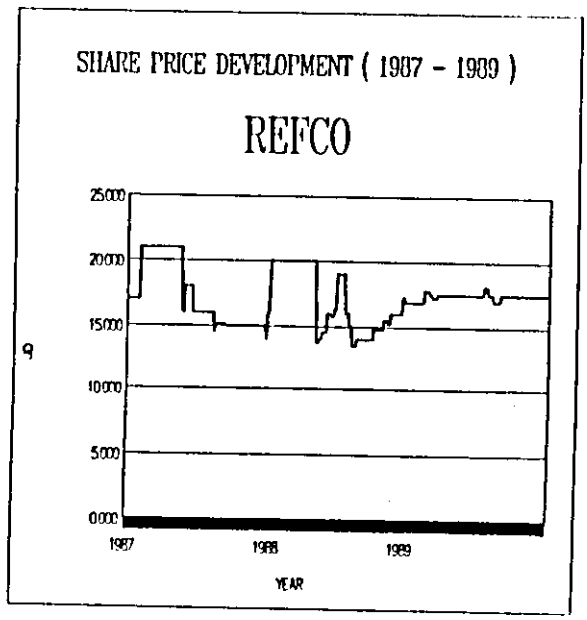


APPENDIX B2

Companies Listed in Amman Financial Market

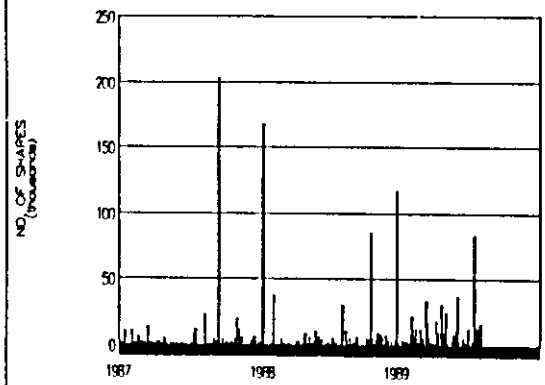
Price Index and Dismissed from the Study





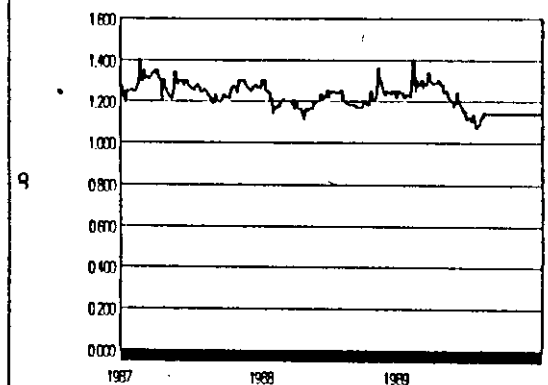
NO. OF SHARES TRADED (1987 - 1989)

JORDAN GULF BANK



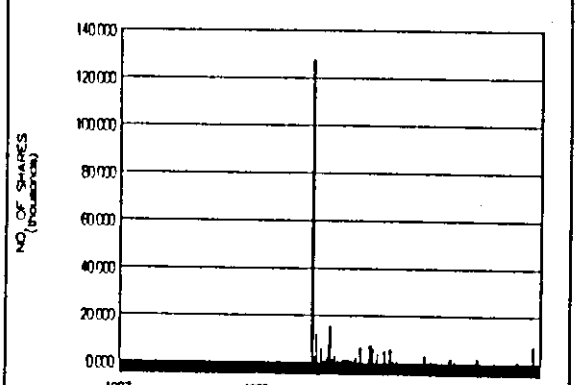
SHARE PRICE DEVELOPMENT (1987 - 1989)

JORDAN GULF BANK



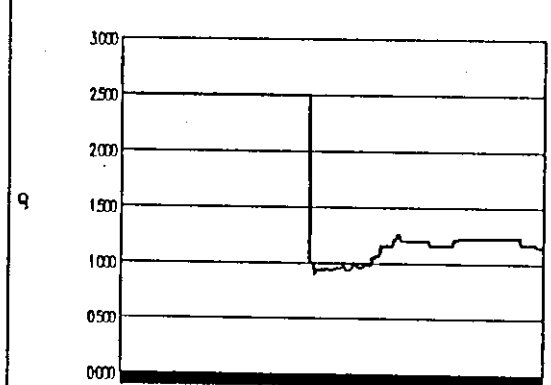
NO. OF SHARES TRADED (1985 - 1989)

UNITED INSURANCE



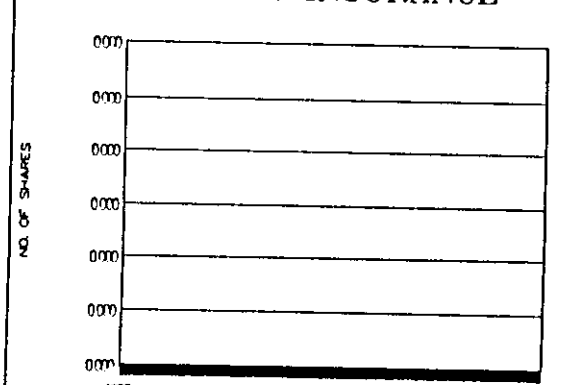
SHARE PRICE DEVELOPMENT (1985 - 1989)

UNITED INSURANCE



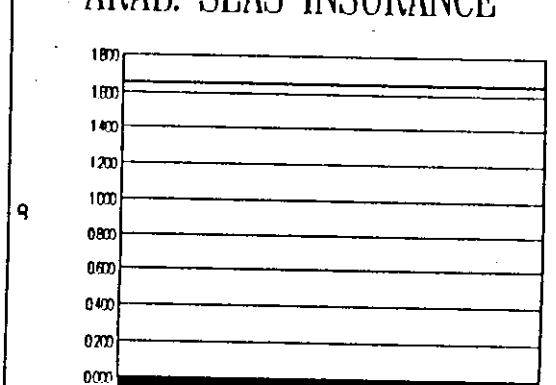
NO. OF SHARES TRADED (1987 - 1989)

ARAB. SEAS INSURANCE



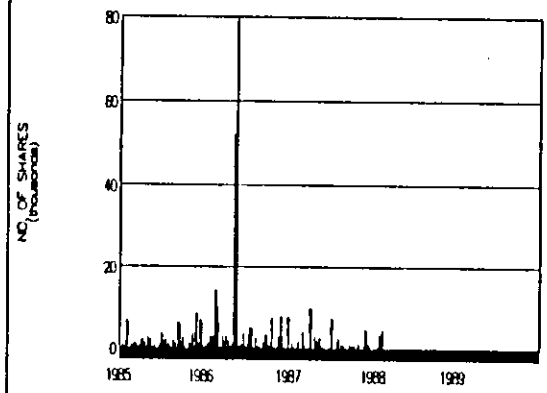
SHARE PRICE DEVELOPMENT (1987 - 1989)

ARAB. SEAS INSURANCE



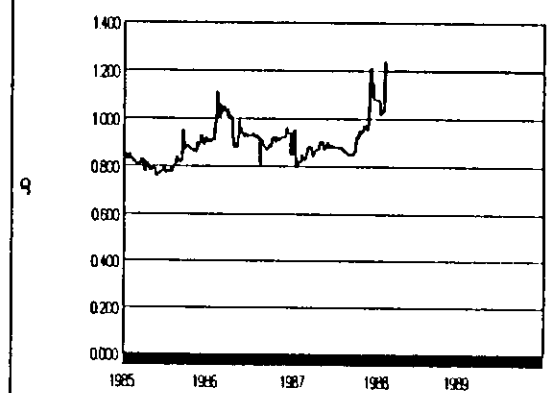
NO. OF SHARES TRADED (1985 - 1989)

ARAB EAGLE INSURANCE



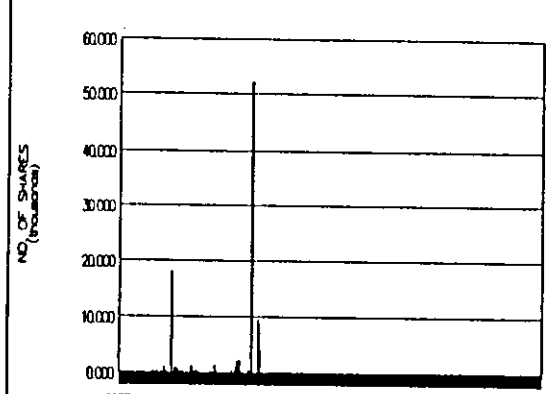
SHARE PRICE DEVELOPMENT (1985 - 1989)

ARAB EAGLE INSURANCE



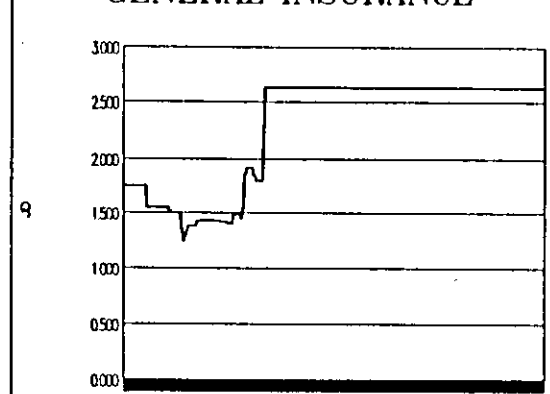
NO. OF SHARES TRADED (1987 - 1989)

GENERAL INSURANCE



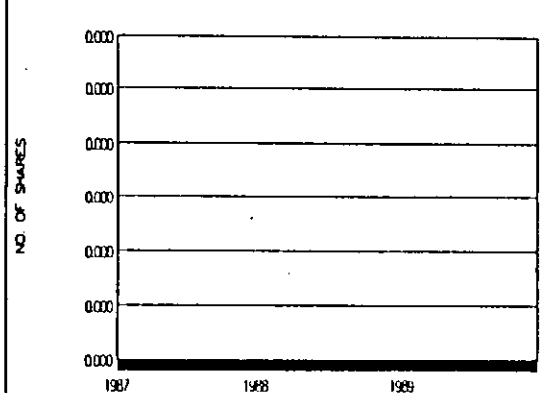
SHARE PRICE DEVELOPMENT (1987 - 1989)

GENERAL INSURANCE



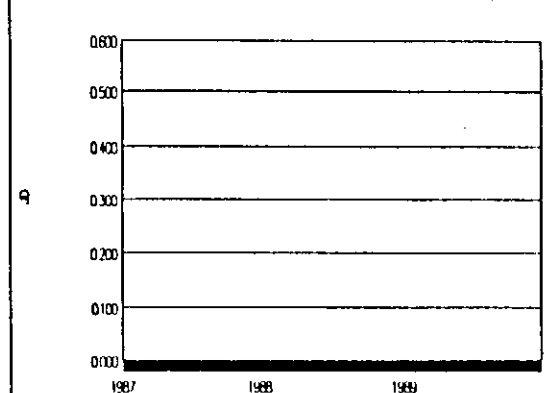
NO. OF SHARES TRADED (1987 - 1989)

INMA ARAB. INVESTMENT



SHARE PRICE DEVELOPMENT (1987 - 1989)

INMA ARAB. INVESTMENT



APPENDIX C

RANDOM SELECTION of THE COMPANIES USING MONTE CARLO SIMULATION

RANDOM SELECTION OF THE COMPANIES USING MONTE CARLO SIMULATION
(VALUE WEIGHTED INDEX APPROACH)
INDEX TRIALS (1 - 40)

15 % SAMPLE

	B	B	I	S	S	N	N	N	N	N
INDEX 31	7	11	23	29	35	41	42	43	44	58
INDEX 32	3	12	22	39	40	53	55	64	67	73
INDEX 33	2	5	20	28	35	54	59	64	67	73
INDEX 34	2	7	25	32	34	43	47	54	59	66
INDEX 35	1	18	25	34	36	53	56	58	66	70
INDEX 36	11	12	24	31	37	41	44	51	57	73
INDEX 37	10	17	20	31	37	56	57	59	65	71
INDEX 38	12	18	26	33	35	50	55	67	69	71
INDEX 39	1	8	24	31	36	44	48	53	68	69
INDEX 40	2	6	21	36	39	46	48	50	61	68

25 % SAMPLE

	B	B	B	B	I	I	S	S	S	N	N	N	N	N	N	N	N	N
INDEX 21	7	8	15	16	21	25	29	32	33	51	56	57	58	62	63	67	68	69
INDEX 22	1	3	11	17	26	27	31	32	37	43	44	46	49	60	65	70	72	73
INDEX 23	2	10	12	16	19	27	29	32	35	42	44	46	48	55	61	64	69	73
INDEX 24	6	7	16	18	20	23	32	33	40	47	50	51	53	62	65	71	72	73
INDEX 25	6	8	13	17	19	25	28	32	39	48	51	52	56	57	58	64	69	70
INDEX 26	1	10	11	17	19	25	29	35	39	41	42	43	44	48	49	58	63	64
INDEX 27	5	6	11	13	20	25	30	35	40	42	44	50	55	60	61	63	64	66
INDEX 28	5	6	7	14	22	24	26	35	40	45	48	53	55	59	61	64	72	73
INDEX 29	2	4	14	18	23	27	28	30	34	44	46	53	59	62	64	66	71	72
INDEX 30	1	4	9	18	21	27	29	31	36	41	42	43	44	45	51	52	68	71

35 % SAMPLE

	B	B	B	B	B	B	I	I	I	S	S	S	S	N	N	N	N	N	N	N	N	N	N	N	N
INDEX 1	1	3	5	8	9	15	19	23	27	29	32	36	39	41	42	43	44	51	52	57	58	59	63	65	70
INDEX 2	1	2	6	9	16	18	19	21	25	29	30	34	40	43	44	46	48	53	59	62	64	66	71	72	73
INDEX 3	2	4	6	9	10	18	20	26	27	28	33	37	40	42	45	46	50	52	55	59	60	61	64	71	73
INDEX 4	2	3	5	6	11	14	19	24	25	30	34	35	39	41	43	44	46	50	51	56	59	62	63	64	71
INDEX 5	1	2	3	5	6	16	19	24	25	29	34	35	39	43	45	46	51	52	53	57	58	62	64	69	72
INDEX 6	2	6	8	10	13	17	22	25	27	30	32	36	40	43	45	48	51	52	53	54	55	58	60	69	72
INDEX 7	1	4	9	12	16	19	20	23	25	28	32	35	40	41	43	44	46	49	58	60	61	65	69	70	72
INDEX 8	6	8	10	13	15	18	21	24	27	30	32	34	39	43	45	49	51	52	54	58	62	64	65	67	68
INDEX 9	2	6	7	12	15	16	20	21	27	34	35	37	40	44	45	48	49	51	52	55	57	60	66	67	70
INDEX 10	2	5	6	7	9	16	21	25	27	28	29	31	32	42	44	46	49	52	54	60	61	64	65	69	71

45 % SAMPLE

	B	B	B	B	B	B	B	B	I	I	I	I	S	S	S	S	S	S	N	N	N	N	N	N	N	N	N	N	N	N	N
INDEX 11	1	2	4	7	8	9	10	16	20	22	26	27	28	30	33	36	37	40	41	42	44	46	48	50	52	56	59	60	61	65	71	73
INDEX 12	2	4	7	9	11	13	14	16	19	20	25	27	28	30	32	35	37	38	42	43	44	45	46	48	49	57	58	60	62	64	68	70
INDEX 13	2	5	7	9	10	12	14	17	19	20	21	27	29	31	32	33	36	37	43	47	49	50	51	52	53	54	60	65	70	71	72	73
INDEX 14	1	2	5	7	12	15	16	18	20	23	25	27	28	29	32	35	36	37	41	42	43	44	46	49	58	60	61	65	69	70	72	73
INDEX 15	4	6	8	11	13	15	17	18	20	22	23	26	29	34	36	37	38	39	41	43	44	45	47	49	50	51	52	54	64	66	68	73
INDEX 16	2	4	7	10	11	14	15	17	21	22	23	27	28	29	30	31	34	36	41	42	46	47	48	50	51	54	55	56	61	62	66	69
INDEX 17	1	3	4	5	7	9	12	13	19	20	23	27	30	31	32	35	36	40	41	42	43	44	46	47	48	49	51	52	58	61	64	67
INDEX 18	1	5	6	7	8	9	16	18	21	22	23	27	30	34	35	36	38	39	42	43	46	47	48	49	50	51	52	54	59	64	66	72
INDEX 19	2	4	6	11	12	14	16	18	22	23	24	25	28	30	35	36	39	40	42	47	50	51	52	54	55	58	61	64	65	66	71	72
INDEX 20	1	2	3	5	11	13	17	18	21	24	25	26	29	30	31	35	36	38	43	47	48	51	56	60	62	64	65	67	68	69	71	72

RANDOM SELECTION OF THE COMPANIES USING MONTE CARLO SIMULATION
(PRICE WEIGHTED INDEX APPROACH)
INDEX TRIALS (41- 80)

15 % SAMPLE

	B	B	I	S	S	N	N	N	N	N
INDEX 71	13	16	26	34	36	45	51	57	59	70
INDEX 72	11	15	27	31	37	43	49	50	70	73
INDEX 73	4	14	20	36	40	44	58	61	69	72
INDEX 74	2	7	24	29	32	46	55	61	64	73
INDEX 75	1	18	21	32	40	43	52	54	55	69
INDEX 76	7	17	22	30	40	50	51	65	71	73
INDEX 77	12	17	25	31	33	43	44	51	63	70
INDEX 78	5	16	22	32	34	56	59	61	64	70
INDEX 79	10	17	24	29	36	43	45	46	60	66
INDEX 80	1	6	20	26	37	50	51	56	59	63

25 % SAMPLE

	B	B	B	B	I	I	S	S	S	N	N	N	N	N	N	N	N
INDEX 61	6	13	15	16	20	21	29	31	39	44	45	46	56	60	61	65	69	72
INDEX 62	2	7	11	18	20	24	30	34	37	42	48	51	52	61	69	70	72	73
INDEX 63	2	8	10	17	22	23	30	40	42	49	50	51	54	62	64	65	70	73
INDEX 64	2	6	13	17	20	21	32	34	39	52	57	58	59	61	62	64	70	72
INDEX 65	2	3	11	12	20	26	28	31	35	41	44	50	51	56	59	62	63	64
INDEX 66	2	4	12	17	23	24	36	37	39	42	43	46	50	51	52	60	64	65
INDEX 67	1	7	12	17	24	25	28	30	31	43	46	53	55	61	64	65	71	72
INDEX 68	8	9	10	16	20	24	29	36	40	46	53	56	59	64	66	71	72	73
INDEX 69	3	4	6	17	19	25	28	29	40	41	42	43	51	53	55	57	59	66
INDEX 70	1	4	10	12	20	23	29	32	36	44	48	49	53	55	67	69	71	73

35 % SAMPLE

	B	B	B	B	B	B	I	I	I	S	S	S	S	N	N	N	N	N	N	N	N	N	N	N	N
INDEX 41	1	12	13	14	15	16	20	21	25	28	29	32	33	41	42	43	44	49	51	52	53	57	58	71	73
INDEX 42	2	5	8	12	13	17	24	25	27	28	29	31	32	42	46	48	52	54	57	59	64	65	71	72	73
INDEX 43	2	3	5	7	8	17	18	26	27	31	32	37	39	42	43	46	56	58	58	60	62	64	66	69	70
INDEX 44	2	7	9	13	14	15	20	23	24	29	30	31	38	42	44	45	46	48	49	52	60	61	64	72	73
INDEX 45	1	3	4	5	12	18	19	21	22	29	31	33	34	43	44	45	48	49	64	66	67	68	70	71	73
INDEX 46	2	5	6	11	16	18	19	21	24	31	33	34	40	41	45	46	47	48	51	52	54	62	67	71	72
INDEX 47	3	5	12	13	15	16	20	21	22	23	36	38	40	41	53	57	58	59	60	61	64	66	68	71	72
INDEX 48	2	3	6	7	11	15	18	20	21	22	35	36	39	41	48	49	52	53	56	57	59	61	62	71	73
INDEX 49	1	2	3	8	9	14	20	21	23	34	35	38	39	41	48	49	52	53	56	57	59	61	62	71	73
INDEX 50	3	4	13	14	15	16	19	20	25	26	29	31	32	42	43	44	45	48	50	51	53	57	58	71	73

45 % SAMPLE

	B	B	B	B	B	B	B	B	I	I	I	I	S	S	S	S	S	S	N	N	N	N	N	N	N	N	N	N	N	N
INDEX 51	1	2	3	4	7	8	14	16	19	20	22	23	31	36	37	38	39	40	42	43	46	51	56	57	58	60	62	64	65	68	69	70
INDEX 52	2	3	4	5	14	15	16	17	19	20	21	26	29	32	34	36	37	39	41	44	45	46	47	49	50	57	59	60	61	67	68	72
INDEX 53	4	5	6	7	9	12	15	18	20	22	25	26	28	30	32	33	38	40	42	44	46	47	48	49	51	55	56	57	60	62	66	71
INDEX 54	3	4	5	7	12	13	15	18	20	21	22	26	33	36	37	38	39	40	42	46	49	50	53	57	58	59	60	61	62	64	66	72
INDEX 55	1	6	7	9	10	11	17	18	24	25	26	27	28	29	31	32	33	40	41	42	43	47	49	50	56	61	62	67	68	69	71	73
INDEX 56	1	2	3	4	6	7	10	11	20	22	24	27	28	29	31	33	38	40	42	43	47	49	53	54	55	56	57	58	61	64	68	70
INDEX 57	1	2	5	6	11	13	16	17	19	21	22	23	29	31	35	37	39	40	42	44	45	46	54	57	61	62	64	65	66	71	72	73
INDEX 58	1	2	3	4	7	8	14	18	20	22	23	27	31	32	37	38	39	40	42	43	48	56	58	59	60	62	63	64	65	68	69	70
INDEX 59	1	3	4	5	14	15	16	17	20	25	26	27	29	32	34	36	37	38	42	43	45	46	49	50	51	52	57	59	60	61	67	72
INDEX 60	4	5	6	7	8	9	12	18	19	20	21	22	30	32	33	36	38	40	42	44	45	46	47	48	49	51	55	56	57	60	69	71

RANDOM SELECTION OF THE COMPANIES USING MONTE CARLO SIMULATION
(EQUALLY WEIGHTED GEOMETRIC INDEX APPROACH)
INDEX TRIALS (81 -120)

15 % SAMPLE

	B	B	I	S	S	N	N	N	N	N
INDEX 111	3	4	24	36	40	42	44	56	69	72
INDEX 112	1	6	20	29	37	46	55	61	69	73
INDEX 113	1	5	27	32	33	43	54	55	69	70
INDEX 114	6	7	30	35	40	50	51	62	65	73
INDEX 115	13	17	21	33	37	43	44	48	51	70
INDEX 116	3	16	23	32	35	57	58	58	64	70
INDEX 117	1	15	25	29	35	43	45	48	49	68
INDEX 118	1	3	25	28	37	50	51	58	59	62
INDEX 119	2	6	27	30	35	55	60	63	64	69
INDEX 120	2	6	19	31	35	50	52	53	60	65

25 % SAMPLE

	B	B	B	B	I	I	S	S	S	N	N	N	N	N	N	N	N	N
INDEX 101	1	4	11	17	20	21	32	36	40	43	46	53	54	55	64	65	71	72
INDEX 102	4	5	9	10	19	20	36	38	40	46	47	53	56	59	64	71	72	73
INDEX 103	1	3	6	13	19	27	28	29	32	41	42	43	51	52	57	58	59	68
INDEX 104	1	2	3	10	20	25	32	39	40	41	42	44	48	49	53	55	67	73
INDEX 105	1	8	10	11	25	26	29	32	36	43	47	50	54	56	59	63	68	69
INDEX 106	2	3	4	17	24	26	33	34	36	41	42	49	51	57	58	61	65	73
INDEX 107	2	6	10	17	23	25	34	37	40	53	57	59	62	67	68	69	71	72
INDEX 108	2	6	8	9	21	24	30	31	36	42	44	46	53	54	61	62	68	69
INDEX 109	4	5	6	12	19	21	30	31	32	43	47	56	62	65	68	69	71	72
INDEX 110	1	3	4	5	21	24	30	35	36	45	59	58	61	63	66	68	70	72

35 % SAMPLE

	B	B	B	B	B	B	I	I	I	S	S	S	S	N	N	N	N	N	N	N	N	N	N	N
INDEX 91	1	5	10	11	12	14	19	20	22	29	31	35	40	53	56	57	58	59	62	64	65	68	71	72	73
INDEX 92	3	6	8	9	15	16	21	24	25	31	32	33	39	41	44	46	47	48	50	51	53	60	61	62	68
INDEX 93	1	2	3	6	9	18	21	26	27	28	36	37	39	46	47	49	56	58	60	61	62	64	66	68	69
INDEX 94	3	5	10	13	17	18	20	21	24	29	30	32	33	50	52	54	55	56	61	63	65	66	67	71	72
INDEX 95	4	11	12	15	16	17	22	23	25	30	33	35	36	42	46	47	48	49	50	52	54	61	64	65	72
INDEX 96	4	6	6	11	16	18	23	24	26	30	34	36	38	41	48	49	50	51	53	54	55	56	68	70	71
INDEX 97	1	2	3	4	5	6	20	22	24	30	36	37	38	44	46	47	48	51	59	61	62	70	71	72	73
INDEX 98	1	5	7	12	13	14	19	23	27	29	31	32	37	45	47	48	49	50	55	56	57	58	60	69	70
INDEX 99	3	5	7	9	15	17	23	26	27	30	34	35	37	41	43	44	47	49	50	51	52	54	64	66	68
INDEX 100	2	6	9	13	14	16	23	26	27	30	32	34	40	43	49	50	51	59	60	63	65	67	70	72	73

45% SAMPLE

	B	B	B	B	B	B	B	B	I	I	I	I	S	S	S	S	S	S	N	N	N	N	N	N	N	N	N	N	N	N	N
INDEX 81	3	6	8	9	11	15	16	18	19	21	22	24	28	29	31	33	35	39	41	43	45	46	47	48	50	51	56	61	62	64	68	71
INDEX 82	2	4	11	12	14	16	17	18	21	24	25	26	30	31	35	36	38	39	43	44	45	47	48	49	50	51	56	60	61	63	70	72
INDEX 83	6	7	8	9	13	14	15	17	23	24	26	27	30	35	36	38	39	40	46	47	48	50	53	54	55	57	60	61	62	63	64	72
INDEX 84	2	3	5	6	7	8	13	16	21	23	24	27	30	33	35	36	37	38	41	43	48	49	50	51	52	53	54	55	56	68	70	71
INDEX 85	1	2	3	4	5	7	10	14	21	22	24	26	30	32	35	36	40	41	42	43	44	46	49	52	54	60	61	63	64	69	71	72
INDEX 86	2	4	5	6	7	9	13	17	21	23	24	27	29	30	31	33	35	36	41	47	48	49	50	51	57	58	59	64	66	67	70	71
INDEX 87	2	3	6	7	8	14	15	16	20	22	23	25	34	35	36	37	38	39	43	45	49	50	51	57	58	60	63	67	70	71	72	73
INDEX 88	3	4	5	10	12	13	14	16	19	20	26	27	29	30	32	34	35	37	42	43	46	48	51	52	54	55	61	66	68	70	72	73
INDEX 89	3	4	6	7	8	14	17	18	20	25	26	27	29	31	32	33	37	39	43	46	52	53	55	56	57	59	59	60	64	69	70	71
INDEX 90	1	2	3	5	6	11	12	16	19	20	22	25	31	32	33	35	36	37	42	43	44	47	50	55	56	57	60	62	63	64	69	71

RANDOM SELECTION OF THE COMPANIES USING MONTE CARLO SIMULATION
(UNWEIGHTED INDEX APPROACH OF PRICE MOVEMENT)
INDEX TRIALS (121 -160)

15 % SAMPLE	B	B	I	S	S	N	N	N	N	N
INDEX 151	3	4	21	29	40	41	42	50	64	71
INDEX 152	1	2	22	28	39	43	51	52	57	59
INDEX 153	1	6	19	29	35	44	45	51	62	69
INDEX 154	1	3	19	33	38	42	44	48	48	55
INDEX 155	1	6	24	33	38	43	52	56	61	64
INDEX 156	4	6	24	29	37	54	56	65	68	69
INDEX 157	1	7	26	34	35	49	53	58	60	61
INDEX 158	2	14	23	28	30	44	49	51	58	71
INDEX 159	3	9	27	34	37	57	59	62	68	72
INDEX 160	7	8	27	34	38	49	50	54	60	73

25 % SAMPLE	B	B	B	B	I	I	S	S	S	N	N	N	N	N	N	N	N	N
INDEX 141	5	7	15	17	23	26	34	37	40	41	43	44	47	48	50	51	59	66
INDEX 142	6	8	14	16	22	23	29	34	37	45	51	57	58	62	67	68	69	70
INDEX 143	1	11	15	18	21	25	27	29	31	44	48	49	58	60	61	65	70	72
INDEX 144	1	2	16	18	22	24	29	30	37	42	46	48	51	55	61	69	72	73
INDEX 145	2	7	8	16	23	27	32	33	40	47	50	51	62	63	65	70	71	73
INDEX 146	2	6	8	13	22	27	29	31	39	52	53	56	57	58	59	62	64	70
INDEX 147	2	11	12	17	20	24	29	31	39	41	42	44	49	51	58	59	63	64
INDEX 148	2	6	12	13	21	27	34	35	39	42	43	48	50	60	61	63	64	65
INDEX 149	6	7	8	12	22	27	31	35	36	45	46	53	55	61	64	71	72	73
INDEX 150	2	8	14	18	23	24	30	31	40	44	46	53	59	62	64	66	71	73

35 % SAMPLE	B	B	B	B	B	B	I	I	I	S	S	S	S	N	N	N	N	N	N	N	N	N	N	N
INDEX 131	1	2	3	4	9	10	19	20	25	32	34	39	40	41	42	44	48	49	53	54	55	59	60	67	73
INDEX 132	2	7	9	12	14	15	21	22	24	29	33	37	39	44	53	56	57	58	59	60	61	65	66	68	70
INDEX 133	1	2	3	5	10	14	22	24	27	29	31	34	37	53	57	58	59	62	65	67	68	69	71	72	73
INDEX 134	2	6	7	8	9	11	20	21	24	29	33	34	39	41	43	45	46	47	48	50	51	61	62	64	68
INDEX 135	1	6	9	16	17	18	20	21	26	30	35	36	39	46	49	50	56	59	60	61	62	64	66	68	69
INDEX 136	3	5	11	13	17	18	20	21	22	30	31	32	38	52	54	55	56	61	63	65	66	67	71	72	73
INDEX 137	4	10	11	12	13	16	21	22	24	33	36	37	40	42	46	47	48	49	50	51	52	54	56	61	64
INDEX 138	4	10	11	16	17	18	24	25	27	30	32	34	39	41	43	48	49	50	51	53	54	55	56	68	71
INDEX 139	2	4	5	6	7	10	22	25	26	30	31	32	36	44	46	47	59	60	61	62	63	70	71	72	73
INDEX 140	1	5	7	8	13	16	19	20	21	30	32	37	39	44	45	48	49	50	55	56	57	59	60	61	69

45 % SAMPLE	B	B	B	B	B	B	B	B	I	I	I	I	S	S	S	S	S	S	N	N	N	N	N	N	N	N	N	N	N	N	N
INDEX 121	2	3	4	5	6	7	8	11	22	23	25	26	32	34	36	37	38	40	47	48	53	54	57	59	60	61	62	63	66	67	68	71
INDEX 122	1	4	6	8	12	13	14	16	19	20	21	22	30	31	33	35	39	40	47	48	50	51	53	54	56	57	58	59	61	66	70	71
INDEX 123	1	2	4	5	6	8	16	18	19	20	22	24	30	32	35	36	37	38	44	46	47	48	51	59	60	61	62	63	64	70	71	72
INDEX 124	1	2	3	5	7	8	13	16	19	21	22	25	31	33	34	35	37	39	44	45	48	49	50	51	55	57	58	60	66	67	70	71
INDEX 125	1	2	4	5	6	10	11	14	20	22	26	27	29	31	32	33	34	37	45	51	56	57	58	59	60	62	63	66	67	68	69	70
INDEX 126	2	5	6	7	13	14	17	18	20	22	24	26	29	35	36	38	39	40	42	43	44	45	46	48	52	55	59	61	64	69	72	73
INDEX 127	2	3	4	7	8	9	16	17	20	21	22	27	32	33	36	38	39	40	43	44	48	49	51	52	53	54	56	58	62	63	69	70
INDEX 128	1	2	10	11	12	14	17	18	19	20	24	26	28	29	30	31	32	37	41	43	47	50	51	55	58	59	60	62	63	64	69	71
INDEX 129	2	3	5	6	11	12	13	14	21	22	23	26	31	32	35	36	37	40	43	45	46	53	54	55	57	61	64	65	70	71	72	73
INDEX 130	3	4	5	9	13	15	17	18	20	22	24	25	29	30	31	34	39	40	41	42	44	45	46	50	51	52	53	57	58	64	68	71

APPENDIX D

DATABASE PROGRAMMES

APPENDIX D1

DATABASE PROGRAMMES

```
*
* PROGRAM  NO. ( 1 )
* TO CREATE 126 FILES ( ONE FOR EACH COMPANY )
*  USIN  AFM  DAILY  REPORTS  FOR  THE  PERIOD  (  01/01/1985  -
31/12/1989 )
* NAME  FILEMAKER
*
*
set stat on
set talk on
clear
sele 1
use num
sele 2
use base
m=1
do while m<128
clear
sele 1
 o m
a=num
sele 2
copy struc to f&a
@05,05 say 'File number'
```

```
@ 05,20 say a
@ 05,25 say 'is established'
@ 05,60 say time()
use f&a
appe from daily1 for serial=m
@ 06,60 say time()
appe from daily2 for serial=m
@ 07,60 say time()
appe from daily3 for serial=m
@ 08,60 say time()
appe from daily4 for serial=m
@ 09,60 say time()
appe from daily5 for serial=m
m=m+1
enddo

*
*
* PROGRAM NO. ( 2 )
* TO CREATE 126 SEPARATE FILES  (ONE FILE FOR EACH COMPANY )
* FOR THE PERIOD ( 01/01/1987 - 31/12/1989 )
* NAME FILERED
*
*
*
sele 1
use filered
```

```
s=reccount()
t1=time()
ss=1
do while ss<s+1
clos all
sele 1
use filered
go ss
h=num
use f&h
1
delete next 502
pack
ss=ss+1
enddo
t2=time()
clea
@ 10,10 say t1
@ 20,10 say t2

*
*
* PROGRAM NO. ( 3 )
* TO PRODUCE RANDOM NUMBER GENERATOR
* USING GPSS APPROACH - TAILORED FOR AFM CATEGORIES
* NAME  RN3533
*
```

```
*
clea
*-------
input 'Banks      : ' to b
?
input 'Insurance  : ' to i
?
input 'Services   : ' to s
?
input 'Industries : ' to n
?
accept 'File #     : ' to f
f=ltrim(f)
*-------
use run
set safe off
copy struc to run&f
set safe on
m=1
do while m<11
clos all
clea
*-------------------------
bb=1
*---------------------------------

do while bb<b+1
```

```
*/////////
do ssran3
*////////
clos all
sele 1
use run&f
sele 2
use currand
1
rand=number
    form = 1+(rand/100000)*18
    num=round(form,0)
    @ 20,60 say num
    sele 1
    appe blank
repl run with m,cat with '1',number with num
bb=bb+1
enddo
*-----------------------------
bb=1
*---------------------------------
do while bb<i+1
*/////////
do ssran3
*////////
clos all
sele 1
```

```
use run&f
sele 2
use currand
1
rand=number
    form = 1+(rand/100000)*9
    num=round(form,0)
    @ 20,60 say num
    sele 1
    appe blank
repl run with m,cat with '2',number with num
bb=bb+1
enddo
*-----------------------------
*-----------------------------
bb=1
*-------------------------------
do while bb<s+1
*/////////
do ssran3
*////////
clos all
sele 1
use run&f
sele 2
use currand
1
```

```
rand=number
    form = 1+(rand/100000)*13
    num=round(form,0)
    @ 20,60 say num
    sele 1
    appe blank
repl run with m,cat with '3',number with num
bb=bb+1
onddo
*-----------------------------
bb=1
*---------------------------------
do while bb<n+1
*/////////
do ssran3
*////////
clos all
sele 1
use run&f
sele 2
use currand
1
rand=number
    form = 1+(rand/100000)*33
    num=round(form,0)
    @ 20,60 say num
    sele 1
```

```
    appe blank
repl run with m,cat with '4',number with num
bb=bb+1
enddo
*-----------------------------
*-----------------------------
m=m+1
enddo

*
*
* PROGRAM NO. ( 4 )
* CALCULATE VALUES OF INDEXES USING
* THE VALUE WEIGHTED AND PRICE WEIGHTED INDEX APPROACHES
* NAME  PI
*
*
m=1
t1=time()
do while m<746
*--------------
sele 1
use main2 alia q
sele 2
use pi
sele 3
use datefile alia df
```

```
go m
*/ / / / / / / /
sele 2
appe blank
repl date with df->date
*- - - - - - - - - - - - -
mm=1
do while mm<74
sele 1
go mm
qty=shares89
if df->date<dateincrea
qty=baseshares
endif
h=ltrim(ser)
v=str(mm,2,0)
v=ltrim(v)

sele 4
use f&h
go m
pr=price
sum1=qty*pr
sele 2
repl q&v with sum1
mm=mm+1
enddo
```

```
m=m+1
enddo
clos all
use
t2=time()
clear
@ 10,10 say t1
@ 13,10 say t2
run copy c:\p\pi.dbf a:

*
*
* PROGRAM NO. ( 5 )
* TO CALCULATE VALUE OF INDEXES USING
* THE UN WEIGHTED INDEX APPROACH OF PRICE MOVEMENTS
* NAME LEVEL
*
*
*
set stat off
set talk off
set score off
clear
sele 1
use york
sele 2
use level
```

```
t1=time()
m=1
do while m<745
@ 01,01 say "Starting time : "
@ 01,30 say t1
@ 01,40 say "Current Rec # York.dbf :"
@ 01,70 say m pict '999'
@ 02,40 say "Remaining Records      :"
@ 02,70 say 745-m pict '999'
sele 1
go m
n=1
do while n<74
t=time()
@ 05,01 say "Current time : "
@ 05,30 say t
@ 05,40 say "Current Q # in Record  : "
@ 05,70 say n pict '99'
@ 06,40 say "Remaining Q # in Record:"
@ 06,70 say 73-n pict '99'
p=ltrim(str(n,2,0))
m&p=q&p
n=n+1
enddo
go m+1
d=date
n=1
```

```
do while n<74
t=time()
@ 05,30 say t
@ 7,40 say "Current Q # in Record+1   :"
@ 07,70 say n pict '99'
@ 08,40 say 'Remaining Q # in Record+1:'
@ 08,70 say 73-n pict '99'
p=ltrim(str(n,2,0))
mm&p=q&p
qq&p=(mm&p-m&p)/m&p
n=n+1
enddo

sele 2
appe blan
repl date with d
n=1
total0=0
do while n<74
t=time()
@ 05,30 say t
@ 10,40 say 'Current record # LEVEL :'
@ 10,70 say m pict '999'
@ 11,40 say 'Remaining records      :'
@ 11,70 say 745-m pict '999'
@ 12,40 say 'Current Q # in Record  :'
@ 12,70 say n pict '99'
```

```
@ 13,40 say 'Remaining Q in Record  :'
@ 13,70 say 73-n pict '99'
p=ltrim(str(n,2,0))
k=ltrim(str((n-1),2,0))
repl q&p with qq&p
repl total with total+qq&p
*repl total with total/73/4.79
n=n+1
enddo
m=m+1
enddo
t2=time()
@ 20,01 say "Finishing Time : "
@ 20,30 say t2
*
*
* NAME  R
*
*
clear
accept 'Enter File Name :  ' to f
clear
use &f
clear
m=1
repl r with temp
do while m<744
```

```
go m
tot2=r
go m+1
repl r with tot2+temp
m=m+1
enddo

*
*
* PROGRAM NO. ( 6 )
* A CASE ( TO CREATE ONE GENERAL NAMED INDEX FORM )
* NAME TOTAL
*
*
sele 1
use level
replace all total with
(q1+q2+q3+q4+q5+q6+q7+q8+q9+q10
+q11+q12+q13+q14+q15+q16+q17+q18)
replace all wtotal with
(q19+q20+q21+q22+q23+q24+q25
+q26+q27+q28+q29+q30+q31)
replace all htotal with
(q32+q33+q34+q35+q36+q37+q38
+q39+q40+q41+q42+q43+q44)
replace all ftotal with
(q45+q46+q47+q48+q49+q50+q51
```

```
+q52+q53+q54+q55+q70+q71+q72+q73)
replace all vtotal
with(q56+q57+q58+q59+q60+q61
+q62+q63+q64+q65+q66+q67+q68+q69)
replace all stotal with (q74+q75+q76+q77+q78+q79+q80)
replace all t with (ototal+wtotal+htotal+ftotal+vtotal+stotal)

*
*
* PROGRAM NO. ( 7 )
* EXAMPLE OF ( THE CREATION OF ONE SIMULATION RUN -RUN104 )
* NAME GGEOM4
*
*
run copy c:geom1.dbf c:sim104.dbf
use sim104
replace  all  ototal  with (log(q2)+log(q3)+log(q5)
                +log(q6)+log(q7)+log(q8)+log(q13))
replace all wtotal with (log(q16)+log(q21)+log(q23)
             + log(q24)+log(q27)+log(q30)+log(q33)
             +log(q35)+log(q36)+log(q37)+log(q38))
replace all htotal with (log(q41)+log(q43)+log(q48)
             +log(q49)+log(q50)+log(q51)+log(q52))
replace all ftotal with (log(q53)+log(q54)+log(q55)
             +log(q56)+log(q68)+log(q70)+log(q71))
replace all tot with ((ototal+wtotal+htotal+ftotal)/32)
replace all re with exp(tot)
```

```
replace all res with ((re-1)*100)

*
* PROGRAM NO. ( 8 )
* TO CALCULATE
* 1. CORRELATION COEFFICIENTS ( B0,B1 )
* 2. THE VALUE OF CORRELATION ( R )
* 3. COEFFICIENT OF DETERMINATION ( R2 )
* NAME  SSCALC1
*
*
closeall
set talk off
set scor off
set stat off
tt=val(sys(2))
*
*
clear
?
?
?
t1=time()
accept 'Enter Starting File (SIM???.dbf) : ' to a1
?
?
accept 'Enter Ending   File (SIM???.dbf) : ' to a2
```

```
?
?
accept 'Enter Target Results File (SSCALC??.DBF) : ' TO A3
s= val(a2)-val(a1)
m=val(a1)
AM=1
use sscalc1
COPY STRUC TO SSCALC&A3
do while am<s+2
mm=ltrim(str(m,3,0))
SELE 1
USE SSCALC&A3
sele 2
use sim&mm
clear
s1=val(sys(2))
if m>val(a1)
@ 12,60 say ttime pict '999'
@ 12,66 say 'sec'
@ 16,60 say (s2-tt) pict '9999'
@ 16,66 say 'sec'
endif
@ 04,09 to 06,40 doub
@ 07,09 to 09,40 doub
set colo to r+/b+*
@ 10,07 to 14,42 doub
@ 11,09 to 13,40 doub
```

```
set colo to w+/b+,w/r+
@ 15,09 to 17,40 doub
@ 15,45 to 17,70 doub
@ 00,09 to 02,40 doub
@ 01,15 say 'Starting Time : '
@ 01,31 say t1
@ 00,45 to 02,70 doub
@ 11,45 to 13,70 doub
@ 01,49 say 'Time : '
@ 05,15 say 'Starting  File : '
@ 08,15 say 'Ending    File :'
@ 12,15 say 'Current   File :'
@ 12,47 say 'Last run sec:'
@ 16,47 say 'Elapsed time:'
@ 16,15 say 'Remaining Files:'
@ 01,60 say time()
@ 05,32 say "SIM"+a1
@ 08,32 say "SIM"+a2
@ 12,32 say 'SIM'
set color to r+/b+*
@ 12,35 say mm
set colo to w+/b+,w/r+
@ 16,35 say val(a2)-val(mm) pict '99'
sum res to sigy
sum res*result to sigxy
abo=(1490892*sigy-32898*sigxy)/28380867
ab1=(745*sigxy-32898*sigy)/28380867
```

```
aver result to rbar
aver res to resbar
sum res*(result-rbar) to over
sum (result-rbar)*(result-rbar) to d1
sum (res-resbar) *(res-resbar)  to d2
dd=d1*d2
d=sqrt(dd)
r=over/d
sele 1
appe blank
repl file with mm, bo with abo, b1 with ab1,r1 with r, r2 with
r*r
s2=val(sys(2))
ttime=s2-s1
m=m+1
am=am+1
enddo
??chr(7)
??chr(7)

*
*
* PROGRAM NO. ( 9 )
* TO CALCULATE
*  CORRELATION  VALUE  BETWEEN  EACH  INDEX  AND  THE  OTHER  163
INDEXES
* TO ELEMINATE THE LOW CORRELATED INDEXES
```

```
* NAME TEST
*
*
clear
set stat off
set scor off
set talk off
clos all
t=time()
acce 'Start   SIM ' to a1
clear
@ 00,00 say 'Starting file : '
@ 00,25 say a1
@ 00,65 say time()
a2='184'
aa1= val(a1)
aa2= val(a2)
quan=val(a2)-val(a1)
cunt=0
all=1
g=aa1
do while all<quan+1
@ 01,00 clear to 03,75
clos all
gg=ltrim(str(g,3,0))
aa=aa1+cunt
use r0
```

```
copy struc to r&gg
@ 01,01 say "Prime File : "
@ 01,25 say gg
@ 01,65 say time()
m=1
do while m<quan+1-cunt
k=ltrim(str(aa+1,3,0))
@ 04,00 clear to 07,75
@ 04,00 say 'Secondary File : '
@ 04,25 say k
@ 04,65 say time()
clos all
sele 1
use sim&gg
sima=reccount()
sele 2
use sim&k
simb=reccount()
sele 3
use r&gg
sele 4
use Z&GG
do case
case sima=745.and.simb=745
sim=745
otherwise
sim=744
```

```
endcase
mm=1
aq=0
do while mm<sim+1
@ 08,00 say 'Record # : '
@ 08,25 say mm
@ 08,65 say time()
sele 1
go mm
cc=total
sele 2
go mm
dd=res
q=cc*dd
aq=aq+q
mm=mm+1
enddo
sele 4
go aa+1
ss=QQ
sele 3
appe blank
repl file with aa+1,q with aq,qq with ss, r with q/qq
@ 11,00 clea to 12,75
@ 11,00 say 'Record in R'
@ 11,12 SAY GG
@ 11,15 SAY '.dbf '
```

```
@ 11,25 say recno()
@ 11,65 say time()
aa=aa+1
m=m+1
enddo
g=g+1
cunt=cunt+1
all=all+1
enddo
use
clea
t1=time()
@ 20,10 say t
@ 20,20 say t1
```

APPENDIX D 2

STRUCTURE OF DATABASE FILES

STRUCTURE OF DATABASE FILE: NUM, DBF

Field	Field Name	Type	Width	Dec
1	NUM	Character	3	
** Total **			4	

STRUCTURE OF DATABASE FILE: BASE.DBF

Field	Field Name	Type	Width	Dec
1	SERIAL	Numeric	3	
2	DAYSERIAL	Numeric	3	
3	DATE	Date	8	
4	SHARES	Numeric	6	
5	PRICE	Numeric	7	3
** Total **			28	

STRUCTURE OF DATABASE FILE: F44.DBF

Field	Field Name	Type	Width	Dec
1	SERIAL	Numeric	3	
2	DAYSERIAL	Numeric	3	
3	DATE	Date	8	
4	SHARES	Numeric	6	
5	PRICE	Numeric	7	3
** Total **			28	

STRUCTURE OF DATABASE FILE: DAILY1.DBF

Field	Field Name	Type	Width	Dec
1	REF	Character	1	
2	DAYSERIAL	Numeric	3	
3	SERIAL	Numeric	3	
4	SHORT	Charactor	10	
5	CATEGORY	Numeric	1	
6	CATNUMBER	Numeric	2	
7	DATE	Date	8	
8	SHARES	Numeric	6	
9	PRICE	Numeric	7	3
** Total **			42	

STRUCTURE OF DATABASE FILE: FILERED.DBF

Field	Field Name	Type	Width	Dec
1	NUM	Character	3	
** Total **			4	

STRUCTURE OF DATABASE FILE: F45.DBF

Field	Field Name	Type	Width	Dec
1	SERIAL	Numeric	3	
2	DAYSERIAL	Numeric	3	
3	DATE	Date	8	
4	SHARES	Numeric	6	
5	PRICE	Numeric	7	3
** Total **			28	

STRUCTURE OF DATABASE FILE: RUN.DBF

Field	Field Name	Type	Width	Dec
1	RUN	Numeric	2	
2	CAT	Character	1	
3	NUMBER	Numeric	2	
4	AFILE	Character	2	
5	NAME	Character	25	
6	NEWSERIAL	Numeric	2	
** Total **			35	

STRUCTURE OF DATABASE FILE: RUN4544.DBF

Field	Field Name	Type	Width	Dec
1	RUN	Numeric	2	
2	CAT	Character	1	
3	NUMBER	Numeric	2	
4	AFILE	Character	2	
5	NAME	Character	25	
6	NEWSERIAL	Numeric	2	
** Total **			35	

STRUCTURE OF DATABASE FILE: RANDOM.DBF

Field	Field Name	Type	Width	Dec
1	RAND	Numeric	5	
** Total **			6	

STRUCTURE OF DATABASE FILE: MAIN2.DBF

Field	Field Name	Type	Width	Dec

1	REC	Character	2	
2	CAT	Character	1	
3	AFILE	Character	2	
4	SER	Character	3	
5	SERIAL	Numeric	3	
6	SHORT	Charactor	10	
7	NEWCAT	Numeric	2	
8	SHARES89	Numeric	8	
9	BASEVALUE	Numeric	7	3
10	BASESHARES	Numeric	8	
11	DATENCREA	Date	8	
12	PRICE79	Numeric	7	3
** Total **			62	

STRUCTURE OF DATABASE FILE: TOT.DBF

Field	Field Name	Type	Width	Dec
1	DATE	DATE	8	
2	Q1	Numeric	10	
3	Q2	Numeric	10	
4	Q3	Numeric	10	
5	Q4	Numeric	10	
6	Q5	Numeric	10	
7	Q6	Numeric	10	
8	Q7	Numeric	10	
9	Q8	Numeric	10	
10	Q9	Numeric	10	

11	Q10	Numeric	10
12	Q11	Numeric	10
13	Q12	Numeric	10
14	Q13	Numeric	10
15	Q14	Numeric	10
16	Q15	Numeric	10
17	Q16	Numeric	10
18	Q17	Numeric	10
19	Q18	Numeric	10
20	Q19	Numeric	10
21	Q20	Numeric	10
22	Q21	Numeric	10
23	Q22	Numeric	10
24	Q23	Numeric	10
25	Q24	Numeric	10
26	Q25	Numeric	10
27	Q26	Numeric	10
28	Q27	Numeric	10
29	Q28	Numeric	10
30	Q29	Numeric	10
31	Q30	Numeric	10
32	Q31	Numeric	10
33	Q32	Numeric	10
34	Q33	Numeric	10
35	Q34	Numeric	10
36	Q35	Numeric	10
37	Q36	Numeric	10

38	Q37	Numeric	10
39	Q38	Numeric	10
40	Q39	Numeric	10
41	Q40	Numeric	10
42	Q41	Numeric	10
43	Q42	Numeric	10
44	Q43	Numeric	10
45	Q44	Numeric	10
46	Q45	Numeric	10
47	Q46	Numeric	10
48	Q47	Numeric	10
49	Q48	Numeric	10
50	Q49	Numeric	10
51	Q50	Numeric	10
52	Q51	Numeric	10
53	Q52	Numeric	10
54	Q53	Numeric	10
55	Q54	Numeric	10
56	Q55	Numeric	10
57	Q56	Numeric	10
58	Q57	Numeric	10
59	Q58	Numeric	10
60	Q59	Numeric	10
61	Q60	Numeric	10
62	Q61	Numeric	10
63	Q62	Numeric	10
64	Q63	Numeric	10

65	Q64	Numeric	10
66	Q65	Numeric	10
67	Q66	Numeric	10
68	Q67	Numeric	10
69	Q68	Numeric	10
70	Q69	Numeric	10
71	Q70	Numeric	10
72	Q71	Numeric	10
73	Q72	Numeric	10
74	Q73	Numeric	10
75	TOTAL	Numeric	754
** Total **			

STRUCTURE OF DATABASE FILE: DATEFILE.DBF

Field	Field Name	Type	Width	Dec
1	DATE	Date	8	
** Total **			9	

STRUCTURE OF DATABASE FILE: F39.DBF

Field	Field Name	Type	Width	Dec
1	SERIAL	Numeric	3	
2	DAYSERIAL	Numeric	3	
3	DATE	Date	8	
4	SHARES	Numeric	6	
5	PRICE	Numeric	7	3
** Total **			28	

STRUCTURE OF DATABASE FILE: YORK.DBF

Field	Field Name	Type	Width	Dec
1	DATE	DATE	8	3
2	Q1	Numeric	13	3
3	Q2	Numeric	13	3
4	Q3	Numeric	13	3
5	Q4	Numeric	13	3
6	Q5	Numeric	13	3
7	Q6	Numeric	13	3
8	Q7	Numeric	13	3
9	Q8	Numeric	13	3
10	Q9	Numeric	13	3
11	Q10	Numeric	13	3
12	Q11	Numeric	13	3
13	Q12	Numeric	13	3
14	Q13	Numeric	13	3
15	Q14	Numeric	13	3
16	Q15	Numeric	13	3
17	Q16	Numeric	13	3
18	Q17	Numeric	13	3
19	Q18	Numeric	13	3
20	Q19	Numeric	13	3
21	Q20	Numeric	13	3
22	Q21	Numeric	13	3
23	Q22	Numeric	13	3
24	Q23	Numeric	13	3
25	Q24	Numeric	13	3

26	Q25	Numeric	13	3
27	Q26	Numeric	13	3
28	Q27	Numeric	13	3
29	Q28	Numeric	13	3
30	Q29	Numeric	13	3
31	Q30	Numeric	13	3
32	Q31	Numeric	13	3
33	Q32	Numeric	13	3
34	Q33	Numeric	13	3
35	Q34	Numeric	13	3
36	Q35	Numeric	13	3
37	Q36	Numeric	13	3
38	Q37	Numeric	13	3
39	Q38	Numeric	13	3
40	Q39	Numeric	13	3
41	Q40	Numeric	13	3
42	Q41	Numeric	13	3
43	Q42	Numeric	13	3
44	Q43	Numeric	13	3
45	Q44	Numeric	13	3
46	Q45	Numeric	13	3
47	Q46	Numeric	13	3
48	Q47	Numeric	13	3
49	Q48	Numeric	13	3
50	Q49	Numeric	13	3
51	Q50	Numeric	13	3
52	Q51	Numeric	13	3

53	Q52	Numeric	13	3
54	Q53	Numeric	13	3
55	Q54	Numeric	13	3
56	Q55	Numeric	13	3
57	Q56	Numeric	13	3
58	Q57	Numeric	13	3
59	Q58	Numeric	13	3
60	Q59	Numeric	13	3
61	Q60	Numeric	13	3
62	Q61	Numeric	13	3
63	Q62	Numeric	13	3
64	Q63	Numeric	13	3
65	Q64	Numeric	13	3
66	Q65	Numeric	13	3
67	Q66	Numeric	13	3
68	Q67	Numeric	13	3
69	Q68	Numeric	13	3
70	Q69	Numeric	13	3
71	Q70	Numeric	13	3
72	Q71	Numeric	13	3
73	Q72	Numeric	13	3
74	Q73	Numeric	13	3
75	TOTAL	Numeric	15	3
76	RESULT	Numeric	10	3
77	TOT	Numeric	15	3
78	RES	Numeric	10	3

** Total ** 1008

STRUCTURE OF DATABASE FILE: LEVEL.DBF

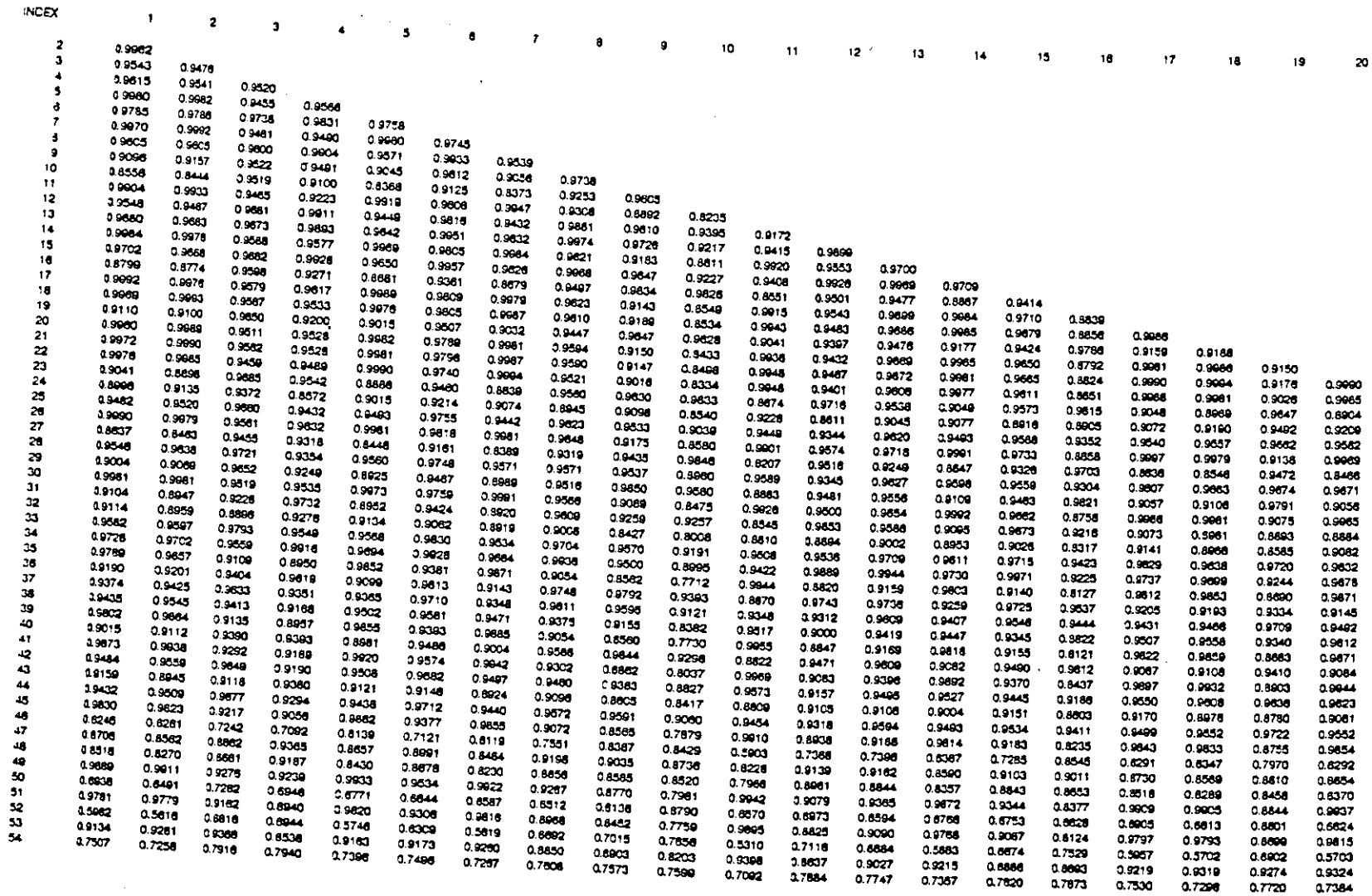
Field	Field Name	Type	Width	Dec.
1	TEMP	Numeric	15	12
2	NDX	Numeric	10	3
3	DATE	Date	8	
4	Q1	Numeric	13	3
5	Q2	Numeric	13	3
6	Q3	Numeric	13	3
7	Q4	Numeric	13	3
8	Q5	Numeric	13	3
9	Q6	Numeric	13	3
10	Q7	Numeric	13	3
11	Q8	Numeric	13	3
12	Q9	Numeric	13	3
13	Q10	Numeric	13	3
14	Q11	Numeric	13	3
15	Q12	Numeric	13	3
16	Q13	Numeric	13	3
17	Q14	Numeric	13	3
18	Q15	Numeric	13	3
19	Q16	Numeric	13	3
20	Q17	Numeric	13	3
21	Q18	Numeric	13	3
22	Q19	Numeric	13	3
23	Q20	Numeric	13	3
24	Q21	Numeric	13	3
25	Q22	Numeric	13	3

26	Q23	Numeric	13	3
27	Q24	Numeric	13	3
28	Q25	Numeric	13	3
29	Q26	Numeric	13	3
30	Q27	Numeric	13	3
31	Q28	Numeric	13	3
32	Q29	Numeric	13	3
33	Q30	Numeric	13	3
34	Q31	Numeric	13	3
35	Q32	Numeric	13	3
36	Q33	Numeric	13	3
37	Q34	Numeric	13	3
38	Q35	Numeric	13	3
39	Q36	Numeric	13	3
40	Q37	Numeric	13	3
41	Q38	Numeric	13	3
42	Q39	Numeric	13	3
43	Q40	Numeric	13	3
44	Q41	Numeric	13	3
45	Q42	Numeric	13	3
46	Q43	Numeric	13	3
47	Q44	Numeric	13	3
48	Q45	Numeric	13	3
49	Q46	Numeric	13	3
50	Q47	Numeric	13	3
51	Q48	Numeric	13	3
52	Q49	Numeric	13	3

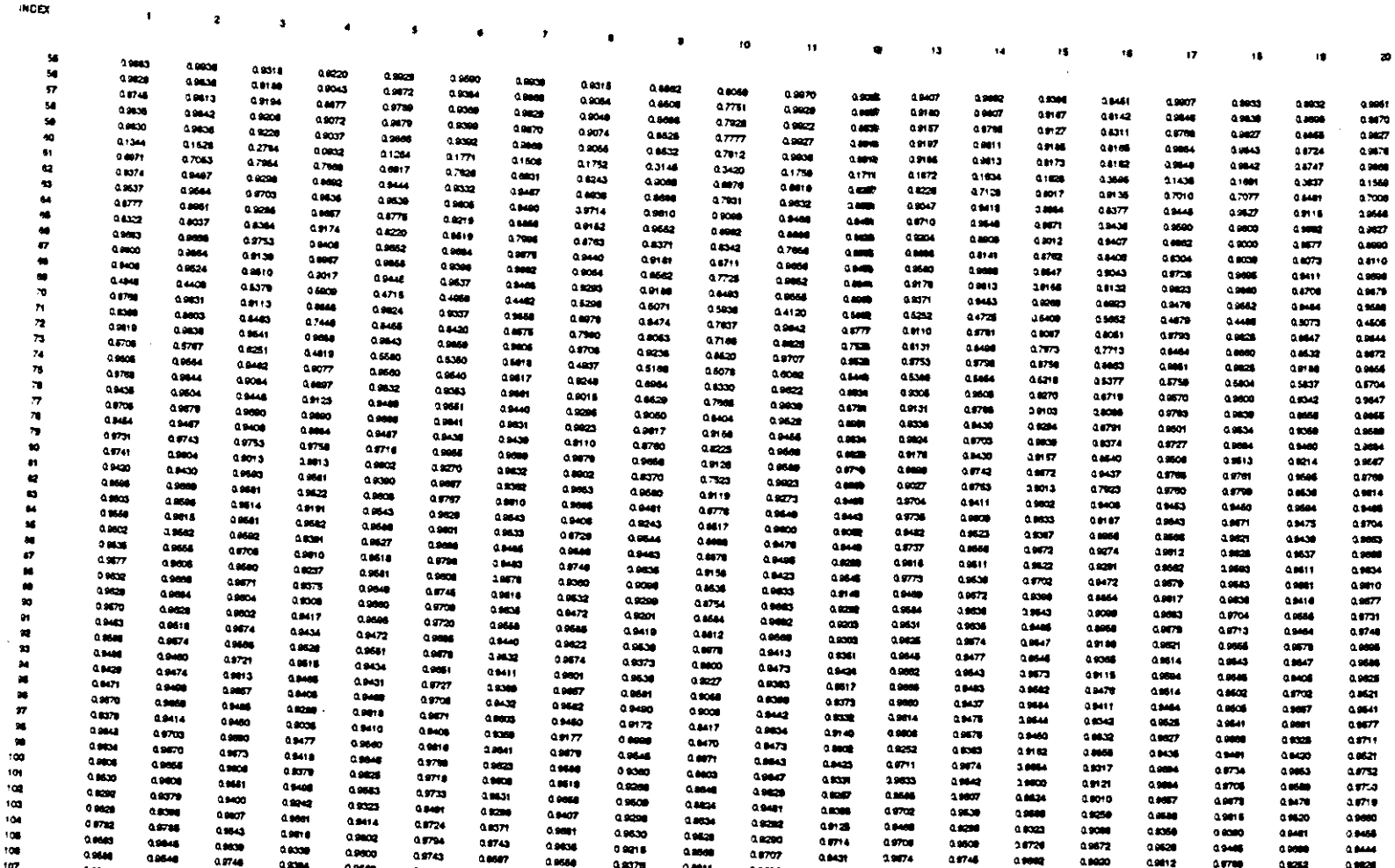
53	Q50	Numeric	13	3
54	Q51	Numeric	13	3
55	Q52	Numeric	13	3
56	Q53	Numeric	13	3
57	Q54	Numeric	13	3
58	Q55	Numeric	13	3
59	Q56	Numeric	13	3
60	Q57	Numeric	13	3
61	Q58	Numeric	13	3
62	Q59	Numeric	13	3
63	Q60	Numeric	13	3
64	Q61	Numeric	13	3
65	Q62	Numeric	13	3
66	Q63	Numeric	13	3
67	Q64	Numeric	13	3
68	Q65	Numeric	13	3
69	Q66	Numeric	13	3
70	Q67	Numeric	13	3
71	Q68	Numeric	13	3
72	Q69	Numeric	13	3
73	Q70	Numeric	13	3
74	Q71	Numeric	13	3
75	Q72	Numeric	13	3
76	Q73	Numeric	13	3
77	TOTAL	Numeric	15	10
78	RESULT			

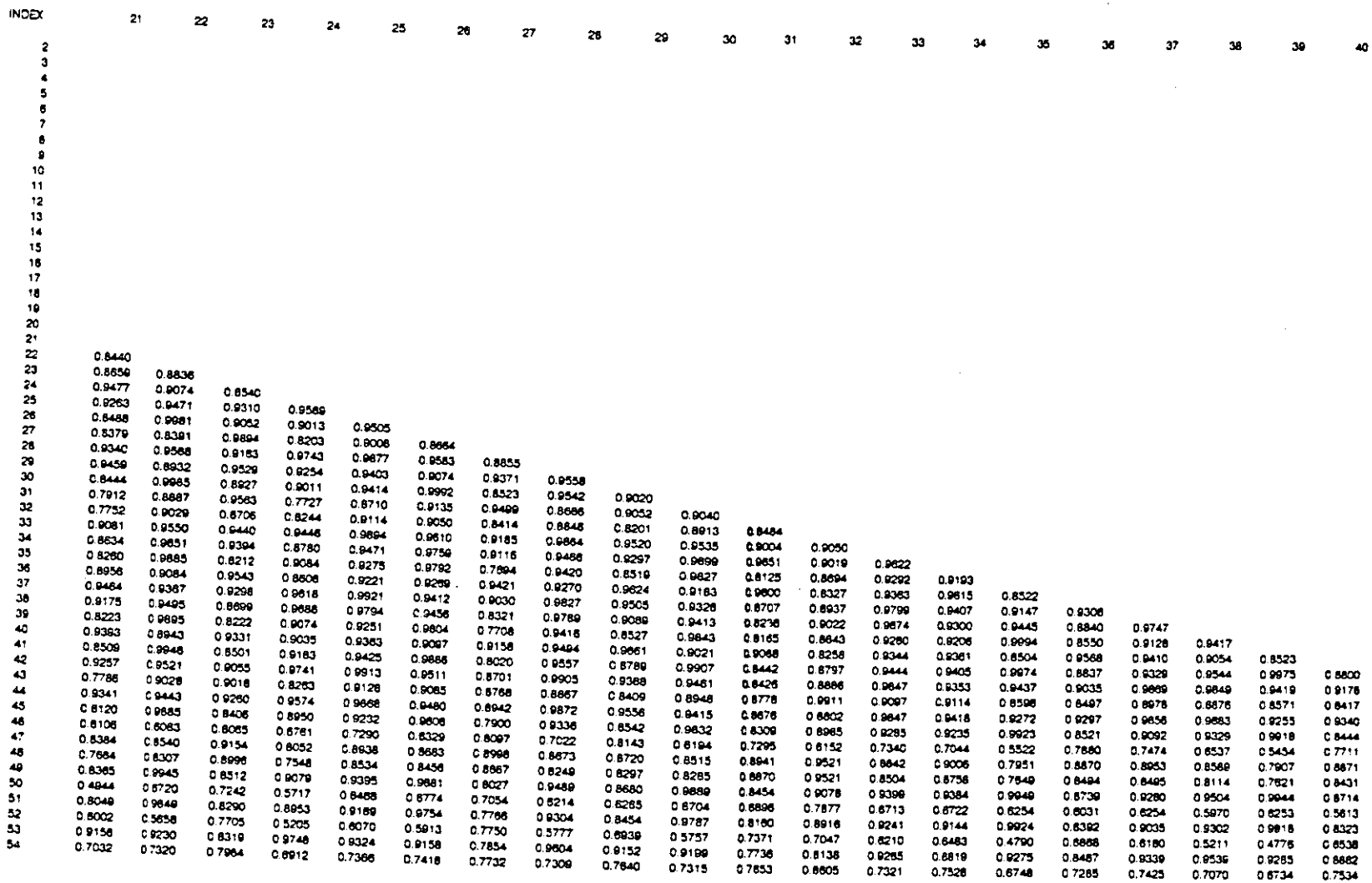
APPENDIX E

CORRELATION COEFFICIENT BETWEEN EACH INDEX and THE GROUP of INDEXES DEVELOPED BY THE STUDY

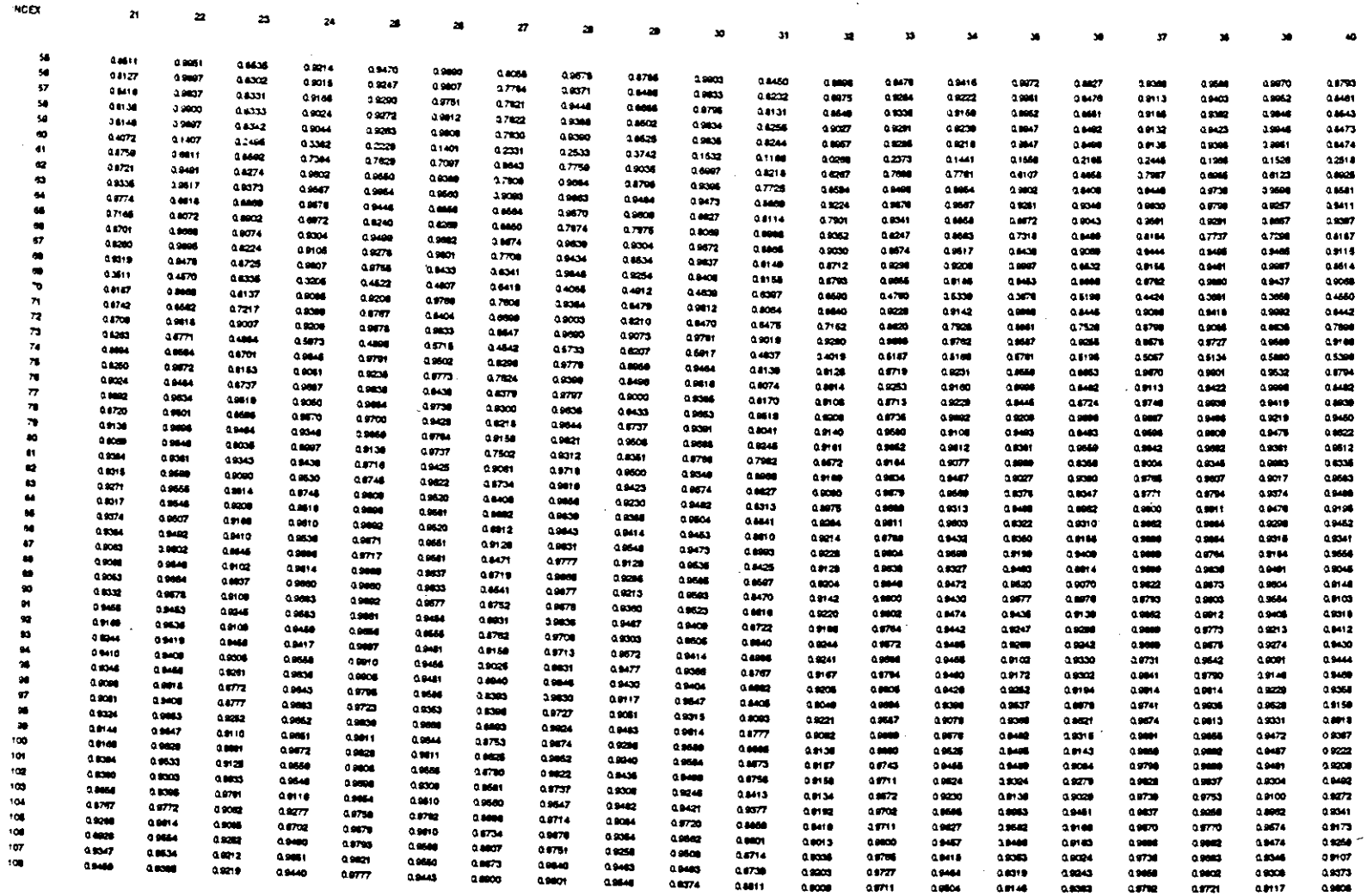


INDEX	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	0.9962																			
3	0.9543	0.9476																		
4	0.9615	0.9541	0.9520																	
5	0.9960	0.9982	0.9455	0.9566																
6	0.9785	0.9786	0.9736	0.9831	0.9758															
7	0.9970	0.9992	0.9481	0.9490	0.9660	0.9745														
8	0.9605	0.9605	0.9600	0.9904	0.9571	0.9933	0.9539													
9	0.9096	0.9157	0.9522	0.9491	0.9045	0.9812	0.9056	0.9738												
10	0.8556	0.8444	0.9519	0.9100	0.8368	0.9125	0.8373	0.9253	0.9605											
11	0.9904	0.9933	0.9465	0.9223	0.9918	0.9606	0.9947	0.9308	0.8892	0.8235										
12	0.9548	0.9467	0.9681	0.9911	0.9449	0.9816	0.9432	0.9861	0.9610	0.9395	0.9172									
13	0.9680	0.9683	0.9673	0.9893	0.9642	0.9951	0.9632	0.9974	0.9726	0.9217	0.9415	0.9699								
14	0.9984	0.9978	0.9588	0.9577	0.9969	0.9805	0.9984	0.9821	0.9183	0.8811	0.9920	0.9553	0.9700							
15	0.9702	0.9668	0.9682	0.9928	0.9650	0.9957	0.9626	0.9968	0.9647	0.9227	0.9408	0.9928	0.9969	0.9709						
16	0.8799	0.8774	0.9598	0.9271	0.8681	0.9361	0.8679	0.9497	0.9834	0.9826	0.8551	0.9501	0.9477	0.8867	0.9414					
17	0.9992	0.9976	0.9579	0.9617	0.9989	0.9809	0.9979	0.9623	0.9143	0.8549	0.9915	0.9543	0.9699	0.9984	0.9710	0.8839				
18	0.9969	0.9963	0.9567	0.9533	0.9976	0.9805	0.9987	0.9610	0.9189	0.8534	0.9943	0.9483	0.9686	0.9985	0.9879	0.8856	0.9986			
19	0.9110	0.9100	0.9650	0.9200	0.9015	0.9507	0.9032	0.9447	0.9647	0.9628	0.9041	0.9397	0.9476	0.9177	0.9424	0.9786	0.9159	0.9168		
20	0.9960	0.9989	0.9511	0.9528	0.9982	0.9789	0.9981	0.9594	0.9150	0.9433	0.9936	0.9432	0.9669	0.9965	0.9650	0.8792	0.9981	0.9966	0.9150	
21	0.9972	0.9990	0.9562	0.9528	0.9981	0.9796	0.9987	0.9590	0.9147	0.8498	0.9945	0.9467	0.9672	0.9981	0.9665	0.8824	0.9990	0.9984	0.9176	0.9990
22	0.9978	0.9985	0.9459	0.9489	0.9990	0.9740	0.9984	0.9521	0.9016	0.8334	0.9948	0.9401	0.9716	0.9977	0.9611	0.8651	0.9966	0.9981	0.9026	0.9965
23	0.9041	0.8696	0.9685	0.9542	0.8886	0.9460	0.8839	0.9560	0.9630	0.9633	0.8674	0.9716	0.9538	0.9049	0.9573	0.9615	0.9048	0.8969	0.9647	0.8904
24	0.8996	0.9135	0.9372	0.8572	0.9015	0.9214	0.9074	0.8945	0.9098	0.8540	0.9228	0.8611	0.9045	0.9077	0.8916	0.8905	0.9072	0.9160	0.9492	0.9209
25	0.9462	0.9520	0.9660	0.9432	0.9493	0.9755	0.9442	0.9623	0.9533	0.9039	0.9449	0.9344	0.9620	0.9493	0.9568	0.9352	0.9540	0.9557	0.9662	0.9562
26	0.9990	0.9979	0.9561	0.9632	0.9981	0.9818	0.9981	0.9648	0.9175	0.8580	0.9901	0.9574	0.9718	0.9991	0.9733	0.8858	0.9997	0.9979	0.9138	0.9969
27	0.8637	0.8463	0.9455	0.9318	0.8448	0.9161	0.8389	0.9319	0.9435	0.8860	0.9207	0.9516	0.9249	0.8647	0.9326	0.9703	0.8836	0.8546	0.9472	0.8466
28	0.9548	0.9638	0.9721	0.9354	0.9560	0.9748	0.9571	0.9571	0.9537	0.9860	0.9589	0.9345	0.9627	0.9698	0.9559	0.9304	0.9807	0.9663	0.9674	0.9671
29	0.9004	0.9069	0.9652	0.9249	0.8925	0.9467	0.8989	0.9516	0.9650	0.9560	0.8863	0.9481	0.9556	0.9109	0.9463	0.9821	0.9057	0.9106	0.9791	0.9056
30	0.9981	0.9981	0.9819	0.9535	0.9973	0.9759	0.9991	0.9556	0.9069	0.8475	0.9928	0.9500	0.9654	0.9992	0.9662	0.8758	0.9966	0.9981	0.9075	0.9965
31	0.9104	0.8947	0.9228	0.9732	0.8952	0.9424	0.8920	0.9609	0.9259	0.9257	0.8545	0.9653	0.9586	0.9065	0.9673	0.9216	0.9073	0.9961	0.8693	0.8884
32	0.9114	0.8959	0.8896	0.9276	0.9134	0.9062	0.8919	0.9008	0.8427	0.8008	0.9191	0.8610	0.8884	0.9002	0.8953	0.9026	0.8317	0.9141	0.8966	0.8585
33	0.9582	0.9597	0.9793	0.9549	0.9568	0.9830	0.9534	0.9704	0.9570	0.9191	0.9568	0.8536	0.9709	0.9611	0.9715	0.9423	0.9829	0.9638	0.9720	0.9632
34	0.9726	0.9702	0.9559	0.9916	0.9694	0.9828	0.9684	0.9636	0.9500	0.8995	0.9422	0.9889	0.9944	0.9730	0.9971	0.9225	0.9737	0.9699	0.9244	0.9678
35	0.9789	0.9657	0.9109	0.8950	0.9852	0.9381	0.9871	0.9054	0.8562	0.7712	0.9844	0.8820	0.9159	0.9803	0.9140	0.8127	0.9812	0.9853	0.8690	0.9871
36	0.9190	0.9201	0.9404	0.9619	0.9099	0.9613	0.9143	0.9748	0.8792	0.9383	0.8870	0.9743	0.9736	0.9259	0.9725	0.9537	0.9205	0.9193	0.9334	0.9145
37	0.9374	0.9425	0.9633	0.9351	0.9365	0.9710	0.9348	0.9811	0.9596	0.9121	0.9348	0.9312	0.9609	0.9407	0.9546	0.9444	0.9431	0.9466	0.9709	0.9492
38	0.9435	0.9545	0.9413	0.9168	0.9502	0.9561	0.9471	0.9375	0.9155	0.8382	0.9517	0.9000	0.9419	0.9447	0.9345	0.9822	0.9507	0.9556	0.9340	0.9612
39	0.9802	0.9664	0.9135	0.8957	0.9855	0.9383	0.9685	0.9054	0.8560	0.7730	0.9955	0.8847	0.9169	0.9818	0.9155	0.8121	0.9622	0.9859	0.8683	0.9871
40	0.9015	0.9112	0.9390	0.9393	0.8981	0.9486	0.9004	0.9566	0.9644	0.9256	0.8822	0.9471	0.9609	0.9062	0.9490	0.9812	0.9067	0.9108	0.9410	0.9084
41	0.9873	0.9838	0.9292	0.9169	0.9920	0.9574	0.9842	0.9302	0.8862	0.8037	0.9969	0.9083	0.9396	0.9892	0.9370	0.8437	0.9897	0.9932	0.8903	0.9944
42	0.9484	0.9559	0.9649	0.9190	0.9508	0.9682	0.9497	0.9480	0.9383	0.8827	0.9573	0.9157	0.9495	0.9527	0.9445	0.9186	0.9550	0.9608	0.9636	0.9623
43	0.9159	0.8945	0.9118	0.9380	0.9121	0.9148	0.8924	0.9096	0.8605	0.8417	0.8809	0.9105	0.9106	0.9004	0.9151	0.8603	0.9170	0.8976	0.8780	0.9081
44	0.9432	0.9509	0.9677	0.9294	0.9438	0.9712	0.9440	0.9672	0.9591	0.9060	0.9454	0.9318	0.9594	0.9493	0.9534	0.9411	0.9499	0.9552	0.9722	0.9552
45	0.9830	0.9823	0.9217	0.9056	0.9862	0.9377	0.9855	0.9072	0.8565	0.7879	0.9910	0.8938	0.9168	0.9814	0.9183	0.8235	0.9843	0.9833	0.8755	0.9854
46	0.6246	0.6281	0.7242	0.7092	0.6139	0.7121	0.6119	0.7551	0.8387	0.8429	0.5903	0.7368	0.7396	0.6367	0.7285	0.8545	0.6291	0.6347	0.7970	0.6292
47	0.8706	0.8562	0.8862	0.9365	0.8657	0.8891	0.8464	0.9198	0.9035	0.8736	0.8228	0.9139	0.9162	0.8590	0.9103	0.9011	0.8730	0.8569	0.8810	0.8854
48	0.8518	0.8270	0.8661	0.9187	0.8430	0.8678	0.8230	0.8656	0.8565	0.8520	0.7966	0.8661	0.8844	0.8357	0.8843	0.8653	0.8518	0.8289	0.8458	0.8370
49	0.9689	0.9611	0.9275	0.9239	0.9933	0.9534	0.9822	0.9267	0.8770	0.7981	0.9942	0.9079	0.9365	0.9672	0.9344	0.8377	0.9909	0.9905	0.8844	0.9937
50	0.6938	0.6491	0.7262	0.6948	0.6771	0.6644	0.6587	0.6512	0.6136	0.8790	0.6870	0.6973	0.6594	0.6768	0.6753	0.6628	0.6905	0.6813	0.6801	0.6624
51	0.9781	0.9779	0.9162	0.8940	0.9820	0.9306	0.9818	0.8968	0.8442	0.7759	0.9865	0.8825	0.9090	0.9766	0.9087	0.8124	0.9797	0.9793	0.8699	0.9815
52	0.5962	0.5818	0.6818	0.6944	0.5746	0.6309	0.5819	0.6892	0.7015	0.7856	0.5310	0.7116	0.6684	0.5883	0.6674	0.7529	0.5957	0.5702	0.6902	0.5703
53	0.9134	0.9261	0.9366	0.8538	0.9163	0.9173	0.9260	0.8850	0.6903	0.8203	0.9398	0.8637	0.9027	0.9215	0.8866	0.8693	0.9219	0.9319	0.9274	0.9324
54	0.7507	0.7258	0.7916	0.7940	0.7396	0.7496	0.7297	0.7808	0.7573	0.7599	0.7092	0.7884	0.7747	0.7357	0.7820	0.7873	0.7530	0.7296	0.7720	0.7384

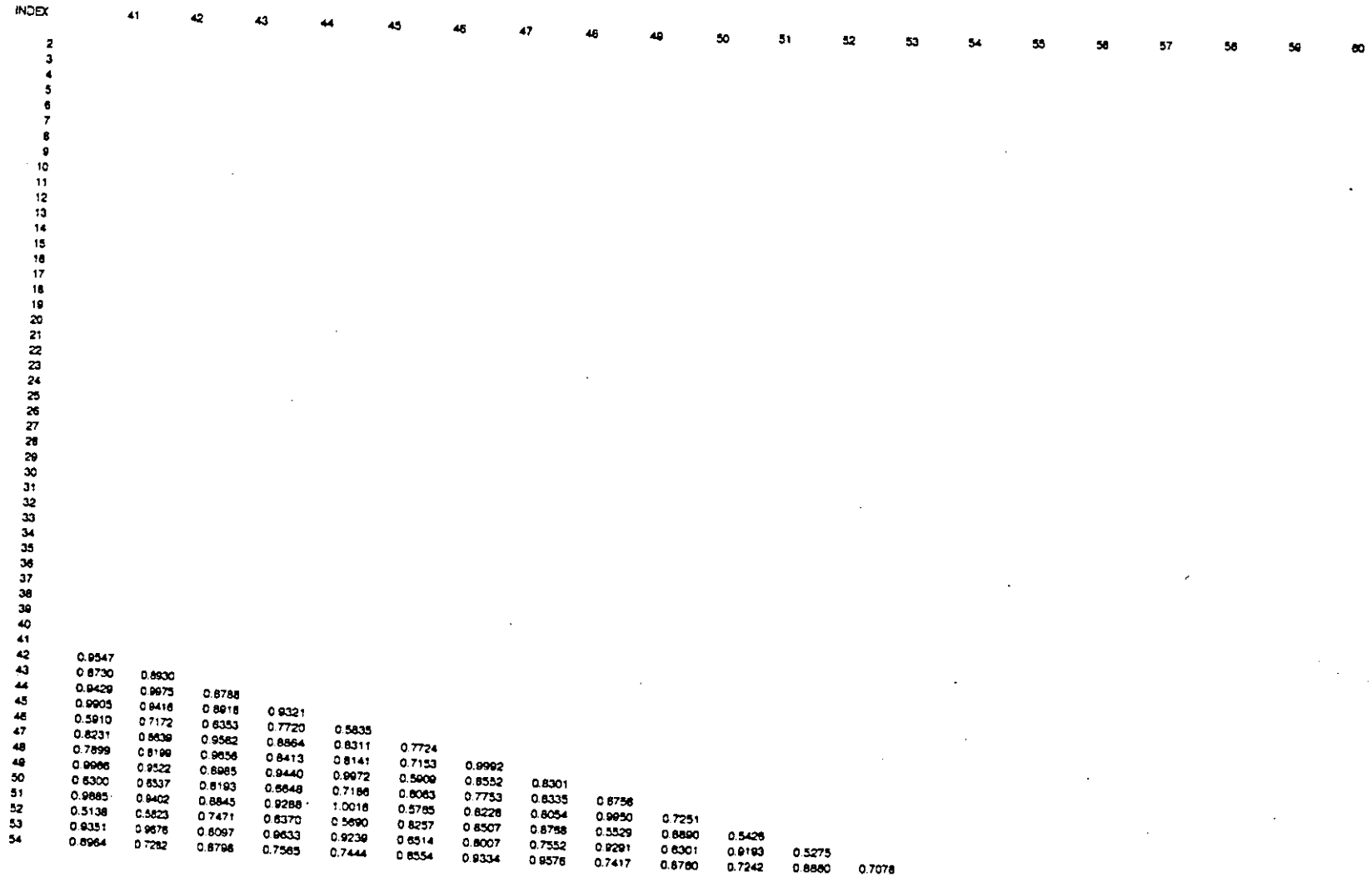




INDEX	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				
11																				
12																				
13																				
14																				
15																				
16																				
17																				
18																				
19																				
20																				
21																				
22	0.8440																			
23	0.8659	0.8836																		
24	0.9477	0.9074	0.8540																	
25	0.9263	0.9471	0.9310	0.9589																
26	0.8488	0.9981	0.9052	0.9013	0.9505															
27	0.8379	0.8381	0.9894	0.8203	0.9006	0.8664														
28	0.9340	0.9568	0.9183	0.9743	0.9877	0.9583	0.8855													
29	0.9459	0.8932	0.9529	0.9254	0.9403	0.9074	0.9371	0.9558												
30	0.8444	0.9985	0.8927	0.9011	0.9414	0.9992	0.8523	0.9542	0.9020											
31	0.7912	0.8887	0.9563	0.7727	0.8710	0.9135	0.9499	0.8686	0.9052	0.9040										
32	0.7752	0.9029	0.8706	0.8244	0.9114	0.9050	0.8414	0.8848	0.8201	0.8913	0.8484									
33	0.9081	0.9550	0.9440	0.9446	0.9894	0.9610	0.9185	0.9864	0.9520	0.9535	0.9004	0.9050								
34	0.8634	0.9851	0.9394	0.8780	0.9471	0.9759	0.9116	0.9456	0.9297	0.9899	0.9851	0.9019	0.9622							
35	0.8260	0.9885	0.8212	0.9084	0.9275	0.9792	0.7894	0.9420	0.8519	0.9627	0.8125	0.8694	0.9292	0.9193						
36	0.8956	0.9084	0.9543	0.8606	0.9221	0.9259	0.9421	0.9270	0.9624	0.9183	0.9600	0.8327	0.9363	0.9815	0.8522					
37	0.9464	0.9367	0.9298	0.9618	0.9921	0.9412	0.9030	0.9827	0.9505	0.9326	0.8707	0.8937	0.9799	0.9407	0.9147	0.9306				
38	0.9175	0.9495	0.8699	0.9688	0.9794	0.9456	0.8321	0.9789	0.9089	0.9413	0.8236	0.9022	0.9874	0.9300	0.9445	0.8840	0.9747			
39	0.8223	0.9895	0.8222	0.9074	0.9251	0.9604	0.7708	0.9416	0.8527	0.9843	0.8165	0.8643	0.9260	0.9206	0.9994	0.8550	0.9128	0.9417		
40	0.9363	0.8943	0.9331	0.9035	0.9363	0.9097	0.9158	0.9494	0.9661	0.9021	0.9068	0.8256	0.9344	0.9361	0.8504	0.9568	0.9410	0.9054	0.8523	
41	0.8509	0.9946	0.8501	0.9183	0.9425	0.9886	0.8020	0.9557	0.8789	0.9907	0.8442	0.8797	0.9444	0.9405	0.9974	0.8837	0.9329	0.9544	0.9973	0.8800
42	0.9257	0.9521	0.9055	0.9741	0.9913	0.9511	0.8701	0.9905	0.9368	0.9461	0.8426	0.8886	0.9847	0.9353	0.9437	0.9035	0.9869	0.9849	0.9419	0.9176
43	0.7786	0.9028	0.9018	0.8263	0.9126	0.9085	0.8768	0.8867	0.8409	0.8948	0.8778	0.9911	0.9097	0.9114	0.8598	0.8497	0.8978	0.8876	0.8571	0.8417
44	0.9341	0.9443	0.9260	0.9574	0.9868	0.9480	0.8942	0.9872	0.9556	0.9415	0.8676	0.8802	0.9847	0.9418	0.9272	0.9297	0.9856	0.9883	0.9253	0.9340
45	0.8120	0.9885	0.8406	0.8950	0.9232	0.9806	0.7900	0.9336	0.8542	0.9832	0.8309	0.8985	0.9285	0.9235	0.9923	0.8521	0.9092	0.9329	0.9918	0.8444
46	0.8106	0.8083	0.8085	0.8761	0.7290	0.8329	0.8097	0.7022	0.8143	0.8194	0.7295	0.8152	0.7340	0.7044	0.5522	0.7880	0.7474	0.6537	0.5454	0.7711
47	0.5384	0.8540	0.9154	0.8052	0.8638	0.8683	0.8998	0.8673	0.8720	0.8515	0.8941	0.9521	0.8642	0.9006	0.7951	0.8870	0.8953	0.8568	0.7907	0.8671
48	0.7664	0.8307	0.8996	0.7548	0.8534	0.8456	0.8867	0.8249	0.8297	0.8285	0.8870	0.9521	0.8504	0.8758	0.7849	0.8494	0.8495	0.8114	0.7821	0.8431
49	0.8365	0.9945	0.8512	0.9079	0.9395	0.9881	0.8027	0.9489	0.8680	0.9889	0.8454	0.9078	0.9399	0.9384	0.9949	0.8739	0.9280	0.9504	0.9944	0.8714
50	0.4944	0.8720	0.7242	0.5717	0.8468	0.8774	0.7054	0.8214	0.8265	0.8704	0.8896	0.7877	0.8713	0.8722	0.8254	0.8031	0.8254	0.5870	0.8253	0.8613
51	0.8049	0.9849	0.8290	0.8953	0.9189	0.9754	0.7766	0.9304	0.8454	0.9787	0.8160	0.8916	0.9241	0.9144	0.9924	0.8392	0.9035	0.9302	0.9818	0.8323
52	0.8002	0.5658	0.7705	0.5205	0.8070	0.5913	0.7750	0.5777	0.6939	0.5757	0.7371	0.7047	0.6210	0.6483	0.4790	0.6868	0.6180	0.5211	0.4775	0.6538
53	0.9156	0.9230	0.8319	0.9748	0.9324	0.9158	0.7854	0.9604	0.9152	0.9199	0.7736	0.8138	0.9265	0.8819	0.9275	0.8487	0.9339	0.9539	0.9285	0.8682
54	0.7032	0.7320	0.7964	0.6912	0.7366	0.7418	0.7732	0.7309	0.7640	0.7315	0.7653	0.8605	0.7321	0.7528	0.6748	0.7285	0.7425	0.7070	0.6734	0.7534



INDEX	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
109	0.9569	0.9076	0.9313	0.9320	0.9868	0.9168	0.9073	0.9660	0.9815	0.9074	0.9662	0.9810	0.9812	0.9389	0.8744	0.9429	0.9719	0.9533	0.9889	0.9824
110	0.9186	0.9463	0.9200	0.9261	0.9676	0.9517	0.9807	0.9644	0.9326	0.9437	0.9810	0.9366	0.9662	0.9508	0.9183	0.9284	0.9696	0.9882	0.9184	0.9413
111	0.9612	0.9080	0.9847	0.9802	0.9478	0.9178	0.9387	0.9392	0.9481	0.9076	0.9036	0.8272	0.9623	0.9277	0.9847	0.9178	0.9417	0.9082	0.9818	0.9186
112	0.9801	0.9648	0.9801	0.9392	0.9896	0.9818	0.8517	0.9867	0.9873	0.9584	0.9421	0.9241	0.9701	0.9302	0.9568	0.8786	0.9873	0.9733	0.8566	0.8788
113	0.9818	0.9583	0.9521	0.9562	0.8727	0.9517	0.8063	0.9715	0.9852	0.9498	0.9020	0.8908	0.9863	0.9213	0.9853	0.8578	0.9576	0.9882	0.9821	0.9732
114	0.9127	0.9536	0.9831	0.9552	0.9797	0.9536	0.8814	0.9818	0.9195	0.9475	0.8676	0.9215	0.9724	0.9462	0.9383	0.8088	0.9720	0.8878	0.9382	0.8256
115	0.9372	0.9331	0.9374	0.9177	0.9802	0.9428	0.9083	0.9815	0.9566	0.9358	0.9186	0.8879	0.9588	0.9862	0.8936	0.9546	0.9829	0.9450	0.8826	0.9724
116	0.9836	0.9513	0.9049	0.9486	0.9701	0.9488	0.8886	0.9864	0.9116	0.9444	0.8674	0.8437	0.9821	0.9341	0.8320	0.8873	0.9866	0.9720	0.8307	0.8877
117	0.8740	0.8721	0.9481	0.9083	0.8849	0.9802	0.8179	0.9824	0.9308	0.8736	0.9378	0.9228	0.9700	0.9771	0.9380	0.9484	0.9837	0.9483	0.9378	0.9364
118	0.8426	0.8438	0.9298	0.8982	0.9309	0.9488	0.8073	0.9347	0.9083	0.9461	0.9124	0.8223	0.9373	0.8389	0.9052	0.9118	0.8286	0.9114	0.9082	0.9320
119	0.9013	0.9560	0.8536	0.9564	0.8748	0.9606	0.8238	0.9788	0.9006	0.9464	0.8226	0.9106	0.8661	0.9304	0.8616	0.8810	0.9659	0.8950	0.9488	0.8884
120	0.8026	0.9317	0.9804	0.8016	0.8853	0.9440	0.8389	0.9543	0.9451	0.9322	0.8371	0.8337	0.8844	0.8656	0.8846	0.8568	0.8639	0.9378	0.8857	0.8648
121	0.9021	0.8258	0.8864	0.9250	0.9821	0.8281	0.8810	0.9534	0.9079	0.9194	0.8486	0.9148	0.8488	0.8243	0.8068	0.8844	0.8811	0.8681	0.9324	0.9084
122	0.8824	0.8084	0.8463	0.8881	0.9380	0.9110	0.8180	0.9340	0.8714	0.9021	0.8186	0.8826	0.8180	0.8058	0.8845	0.8754	0.8370	0.8488	0.8805	0.8852
123	0.8382	0.8837	0.8301	0.8861	0.9084	0.8862	0.7918	0.8884	0.8331	0.8783	0.7878	0.8858	0.8858	0.8771	0.8870	0.8387	0.9022	0.8185	0.8835	0.8534
124	0.8648	0.8201	0.8868	0.8868	0.8387	0.9344	0.8388	0.8308	0.8715	0.9148	0.8523	0.8189	0.8242	0.8241	0.8867	0.8878	0.8338	0.8454	0.8835	0.8847
125	0.8000	0.8337	0.8874	0.8144	0.8850	0.8377	0.8816	0.8556	0.8004	0.8273	0.8588	0.8251	0.8483	0.8370	0.8129	0.8084	0.8834	0.8883	0.8086	0.8187
126	0.8128	0.8377	0.8884	0.8258	0.8806	0.8478	0.8408	0.8734	0.8513	0.8344	0.8088	0.8383	0.8846	0.8881	0.8051	0.8388	0.8888	0.8586	0.8013	0.8378
127	0.8258	0.8256	0.8025	0.8273	0.8887	0.8307	0.8730	0.8538	0.8288	0.8216	0.8810	0.8883	0.8878	0.8341	0.8048	0.8180	0.8881	0.8584	0.8002	0.8300
128	0.8332	0.8816	0.8351	0.8548	0.8081	0.8858	0.8087	0.8880	0.8437	0.8886	0.8242	0.8773	0.8827	0.8845	0.8886	0.8804	0.8025	0.8133	0.8870	0.8884
129	0.8010	0.8186	0.8148	0.8047	0.8819	0.8286	0.8803	0.8488	0.8172	0.8154	0.8746	0.8186	0.8525	0.8057	0.8807	0.8142	0.8808	0.8482	0.8886	0.8178
130	0.8778	0.8302	0.8311	0.8020	0.8834	0.8387	0.8114	0.8502	0.8180	0.8288	0.8888	0.8382	0.8858	0.8427	0.8858	0.8186	0.8808	0.8411	0.8841	0.8183
131	0.8801	0.8438	0.8880	0.8805	0.8488	0.8487	0.8340	0.8422	0.8728	0.8380	0.8880	0.8383	0.8325	0.8414	0.8215	0.8871	0.8420	0.8808	0.8182	0.8013
132	0.8178	0.8822	0.8317	0.8830	0.8801	0.8038	0.8188	0.8408	0.8404	0.8818	0.8888	0.8888	0.8437	0.8228	0.8843	0.8338	0.8871	0.8171	0.8805	0.8311
133	0.8434	0.8013	0.8488	0.8851	0.8218	0.8053	0.8224	0.8108	0.8515	0.8848	0.8318	0.8081	0.8058	0.8788	0.8888	0.8188	0.8284	0.8750	0.8720	
134	0.8748	0.8782	0.8031	0.8480	0.8103	0.8807	0.8834	0.8072	0.8073	0.8808	0.8821	0.8852	0.8078	0.8108	0.8381	0.8120	0.8138	0.8884	0.8348	0.8118
135	0.8813	0.8118	0.8858	0.8741	0.8330	0.8171	0.8411	0.8253	0.8721	0.8083	0.8535	0.8125	0.8178	0.8203	0.8884	0.8888	0.8300	0.8380	0.8821	0.8888
136	0.8230	0.8088	0.8118	0.8154	0.8707	0.8172	0.8888	0.8871	0.8258	0.8080	0.8821	0.8037	0.8874	0.8847	0.8181	0.8717	0.8535	0.8782	0.8274	
137	0.8317	0.8788	0.8285	0.8883	0.8622	0.8810	0.8038	0.8382	0.8378	0.8783	0.8880	0.8788	0.8408	0.8121	0.8480	0.8243	0.8883	0.8183	0.8408	0.8338
138	0.8027	0.8480	0.8081	0.8188	0.8880	0.8818	0.8848	0.8848	0.8278	0.8438	0.8824	0.8025	0.8821	0.8585	0.8187	0.8378	0.8888	0.8581	0.8173	0.8373
139	0.8017	0.8332	0.8022	0.8302	0.8883	0.8358	0.8748	0.8803	0.8135	0.8287	0.8580	0.8272	0.8884	0.8282	0.8128	0.8888	0.8884	0.8840	0.8088	0.8084
140	0.8750	0.8042	0.8588	0.8778	0.8308	0.8082	0.8317	0.8281	0.8748	0.8886	0.8433	0.8808	0.8130	0.8133	0.8810	0.8812	0.8304	0.8380	0.8778	0.8038
141	0.8834	0.8337	0.8248	0.8037	0.8544	0.8414	0.8008	0.8482	0.8217	0.8325	0.8034	0.8032	0.8524	0.8482	0.8878	0.8288	0.8844	0.8058	0.8881	0.8254
142	0.8137	0.8382	0.8371	0.8255	0.8780	0.8330	0.8127	0.8812	0.8358	0.8228	0.8832	0.8201	0.8880	0.8408	0.8882	0.8228	0.8718	0.8528	0.8838	0.8218
143	0.8347	0.8878	0.8542	0.8411	0.8086	0.8048	0.8333	0.8882	0.8502	0.8037	0.8583	0.8087	0.8808	0.8115	0.8843	0.8842	0.8088	0.8123	0.8822	0.8884
144	0.8388	0.8081	0.8278	0.8747	0.8180	0.8083	0.7871	0.8148	0.8378	0.8878	0.8075	0.8011	0.8003	0.8842	0.8824	0.8473	0.8125	0.8388	0.8880	0.8834
145	0.8880	0.8821	0.8716	0.8327	0.8815	0.8508	0.8380	0.8801	0.8828	0.8448	0.8488	0.8257	0.8481	0.8381	0.8376	0.8815	0.8884	0.8788	0.8388	0.8858
146	0.8115	0.8757	0.8340	0.8828	0.8538	0.8877	0.8238	0.8380	0.8318	0.8740	0.8700	0.8811	0.8440	0.8080	0.8401	0.8188	0.8875	0.8113	0.8348	0.8174
147	0.8843	0.8888	0.8337	0.8548	0.8273	0.8148	0.8200	0.8188	0.8148	0.8024	0.8175	0.8037	0.8248	0.8343	0.8504	0.8380	0.8331	0.8888	0.8488	0.8188
148	0.8888	0.8881	0.8183	0.8485	0.8187	0.8181	0.8038	0.8117	0.8104	0.8887	0.8130	0.8885	0.8180	0.8382	0.8478	0.8328	0.8238	0.8888	0.8485	0.8250
149	0.8178	0.8238	0.8882	0.8382	0.8738	0.8253	0.8873	0.8822	0.8153	0.8158	0.8400	0.8185	0.8581	0.8218	0.8074	0.8841	0.8713	0.8888	0.8022	0.8083
150	0.8034	0.8388	0.8018	0.8238	0.8722	0.8438	0.8748	0.8883	0.8173	0.8341	0.8881	0.8313	0.8828	0.8438	0.8174	0.8138	0.8887	0.8705	0.8138	0.8202
151	0.8341	0.8272	0.8371	0.7823	0.8817	0.8512	0.8384	0.8820	0.8848	0.8337	0.8198	0.8808	0.8808	0.8888	0.7584	0.8147	0.8887	0.8342	0.7581	0.8074
152	0.8173	0.8888	0.7918	0.8812	0.8004	0.8888	0.7805	0.8870	0.8070	0.8882	0.7883	0.8888	0.8787	0.8801	0.8880	0.8248	0.8048	0.8282	0.8854	0.8443
153	0.8122	0.8782	0.8117	0.8288	0.8881	0.8803	0.7880	0.8808	0.8138	0.8887	0.8088	0.8887	0.8883	0.8808	0.8541	0.8418	0.8838	0.8083	0.8804	0.8518
154	0.7884	0.8487	0.7801	0.7965	0.8536	0.8507	0.7308	0.8452	0.7808	0.8408	0.7817	0.8881	0.8302	0.8450	0.8338	0.7918	0.8488	0.8808	0.8308	0.8084
155	0.8388	0.8788	0.8180	0.8377	0.8048	0.8801	0.7958	0.8827	0.8284	0.8878	0.8088	0.8884	0.8827	0.8850	0.8548	0.8528	0.8018	0.8153	0.8482	0.8844
156	0.8818	0.8322	0.8214	0.8420	0.8207	0.8408	0.8154	0.8030	0.8234	0.8341	0.8823	0.8352	0.8184	0.8848	0.7807	0.8180	0.8247	0.8888	0.7843	0.8038
157	0.8028	0.8832	0.7814	0.8337	0.8818	0.8830	0.7488	0.8778	0.7845	0.8748	0.7848	0.8788	0.8481	0.8724	0.8880	0.8222	0.8775	0.8118	0.8883	0.8370
158	0.8848	0.8848	0.8088	0.8318	0.8788	0.8543	0.8777	0.8748	0.8228	0.8810	0.8784	0.8084	0.8733	0.8538	0.8348	0.8221	0.8701	0.8738	0.8334	0.8221
159	0.8818	0.8434	0.8880	0.8881	0.8780	0.8488	0.8378	0.8848	0.8077	0.8428	0.8008	0.8286	0.8878	0.8418	0.8138	0.8843	0.8833	0.8875	0.8133	0.8732
160	0.8188	0.8332	0.8882	0.8482	0.8881	0.8312	0.8281	0.8887	0.8138	0.8288	0.8183	0.8548	0.8882	0.8208	0.8282	0.8883	0.8808	0.8708	0.8251	0.8082
AFM1	0.8884	0.8288	0.8728	0.8585	0.8318	0.8448	0.8870	0.8278	0.8481	0.8383	0.8811	0.8880	0.8458	0.8785	0.8883	0.8702	0.8313	0.8884	0.8873	0.8474
AFM2	0.4828	0.5832	0.8088	0.4886	0.5318	0.5888	0.5788	0.5215	0.5858	0.5808	0.5888	0.8827	0.5407	0.5823	0.5088	0.5142	0.5380	0.5002	0.5088	0.5083
AFM3	0.8447	0.8504	0.8170	0.8581	0.8883	0.8528	0.8788	0.8812	0.8585	0.8488	0.8815	0.8884	0.8888	0.8503	0.8284	0.8370	0.8727	0.8878	0.8282	0.8838
AFM4	0.8787	0.8482	0.8838	0.8481	0.8837	0.8814	0.8784	0.8808	0.8088	0.8822	0.8834	0.8281	0.8828	0.8885	0.8058	0.8048	0.8038	0.8813	0.8048	0.8013



INDEX	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
2																				
3																				
4																				
5																				
6																				
7																				
8																				
9																				
10																				
11																				
12																				
13																				
14																				
15																				
16																				
17																				
18																				
19																				
20																				
21																				
22																				
23																				
24																				
25																				
26																				
27																				
28																				
29																				
30																				
31																				
32																				
33																				
34																				
35																				
36																				
37																				
38																				
39																				
40																				
41																				
42	0.9547																			
43	0.8730	0.8930																		
44	0.9429	0.9975	0.8788																	
45	0.9905	0.9416	0.8918	0.9321																
46	0.5910	0.7172	0.6353	0.7720	0.5835															
47	0.8231	0.8639	0.9562	0.8864	0.8311	0.7724														
48	0.7899	0.8199	0.9656	0.8413	0.8141	0.7153	0.9992													
49	0.9966	0.9522	0.8985	0.9440	0.9972	0.5909	0.8552	0.8301												
50	0.6300	0.6537	0.8193	0.6648	0.7186	0.8063	0.7753	0.8335	0.8756											
51	0.9885	0.8402	0.8845	0.9288	1.0016	0.5785	0.8226	0.8054	0.9950	0.7251										
52	0.5138	0.5823	0.7471	0.6370	0.5690	0.8257	0.8507	0.8758	0.5529	0.8890	0.5426									
53	0.9351	0.9676	0.8097	0.9633	0.9239	0.6514	0.8007	0.7552	0.9291	0.6301	0.9193	0.5275								
54	0.8964	0.7282	0.8798	0.7565	0.7444	0.8554	0.9334	0.9576	0.7417	0.8780	0.7242	0.8880	0.7078							

INDEX	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
58	0.9806	0.9808	0.9804	0.9814	0.9827	0.5872	0.8388	0.8053	0.9989	0.6478	0.9864	0.5204	0.9317	0.6940						
59	0.9831	0.9427	0.8680	0.9297	0.9892	0.5522	0.8308	0.8114	0.9981	0.6837	0.9867	0.5293	0.9219	0.7143	0.9949					
57	0.9834	0.9537	0.8478	0.9448	0.9838	0.6127	0.7984	0.7870	0.9804	0.6653	0.9811	0.5146	0.9307	0.6984	0.9828	0.9878				
58	0.9827	0.9440	0.8638	0.9310	0.9892	0.5564	0.8348	0.8160	0.9883	0.6985	0.9858	0.5332	0.9213	0.7215	0.9849	0.9868	0.9876			
59	0.9828	0.9449	0.8686	0.9329	0.9906	0.5583	0.8304	0.8118	0.9987	0.6986	0.9880	0.5356	0.9242	0.7203	0.9947	0.9884	0.9882	1.0004		
60	0.1838	0.2944	0.0493	0.3361	0.1924	0.6418	0.1516	0.1024	0.1448	0.3810	0.1867	0.3907	0.3637	0.1667	0.1564	0.1362	0.2406	0.1415	0.1460	
61	0.8568	0.7488	0.8548	0.8101	0.8208	0.8906	0.8086	0.7567	0.8458	0.4891	0.5971	0.7306	0.7016	0.6770	0.8541	0.8027	0.8363	0.8082	0.8079	0.4232
62	0.9817	0.9832	0.8444	0.9706	0.9497	0.5863	0.7928	0.7486	0.9564	0.6203	0.9497	0.4631	0.9816	0.6520	0.9540	0.9831	0.9598	0.9560	0.9548	0.2478
63	0.9481	0.9822	0.9210	0.9948	0.9292	0.7516	0.9206	0.8603	0.9464	0.6733	0.9208	0.6362	0.9312	0.7549	0.9501	0.9270	0.9293	0.9314	0.9280	0.2290
64	0.8466	0.9629	0.7930	0.9770	0.8812	0.6137	0.8402	0.7750	0.8757	0.5802	0.8619	0.6086	0.8363	0.6841	0.8676	0.8639	0.8670	0.8589	0.8574	0.4417
65	0.7804	0.7793	0.8460	0.8032	0.7788	0.8948	0.8662	0.8986	0.7962	0.8003	0.7579	0.8411	0.6721	0.8784	0.7708	0.7873	0.7194	0.7758	0.7983	-0.0126
66	0.9564	0.9634	0.8080	0.9636	0.9570	0.6627	0.8816	0.8537	0.9802	0.7418	0.9480	0.6403	0.9636	0.7900	0.9580	0.9647	0.9430	0.9667	0.9662	0.2414
67	0.9876	0.9478	0.8589	0.9340	0.9840	0.5547	0.8028	0.7734	0.9868	0.6376	0.9816	0.4821	0.9268	0.6706	0.9880	0.9860	0.9840	0.9883	0.9848	0.1537
68	0.9663	0.9828	0.8884	0.9877	0.9358	0.6728	0.8644	0.8047	0.9608	0.6131	0.9316	0.5369	0.9883	0.7079	0.9586	0.9387	0.9454	0.9427	0.9410	0.2567
69	0.3920	0.4182	0.8980	0.4583	0.4748	0.6266	0.7481	0.8076	0.4465	0.9251	0.4817	0.9396	0.3240	0.7700	0.4024	0.4278	0.3871	0.4392	0.4301	0.1991
70	0.9958	0.9431	0.8531	0.9284	0.9837	0.5404	0.7933	0.7954	0.9950	0.6403	0.9814	0.4761	0.9303	0.6700	0.9961	0.9961	0.9928	0.9962	0.9947	0.1561
71	0.8663	0.9277	0.7013	0.9173	0.8868	0.6104	0.8825	0.8150	0.8708	0.5207	0.8882	0.3868	0.9443	0.5816	0.8848	0.8676	0.8990	0.8889	0.8701	0.4288
72	0.8720	0.9669	0.9202	0.9847	0.9548	0.6404	0.8866	0.8664	0.9740	0.6908	0.9488	0.5779	0.9206	0.7353	0.8756	0.9807	0.9467	0.9540	0.9564	0.1054
73	0.8797	0.8570	0.4258	0.8748	0.8011	0.3244	0.4240	0.4284	0.5782	0.8276	0.5844	0.4139	0.7027	0.5366	0.8745	0.8938	0.8946	0.8958	0.8000	0.4608
74	0.9808	0.9828	0.8992	0.9779	0.9528	0.6453	0.8846	0.8174	0.9813	0.6870	0.9808	0.5349	0.9813	0.7046	0.9858	0.9843	0.9536	0.9883	0.9848	0.2194
75	0.9870	0.9449	0.8408	0.9312	0.9830	0.5848	0.7933	0.7823	0.9849	0.6298	0.9808	0.4734	0.9281	0.6810	0.9885	0.9836	0.9860	0.9846	0.9830	0.1651
76	0.9523	0.9800	0.8886	0.9736	0.9376	0.6618	0.8830	0.8219	0.9618	0.6348	0.9347	0.5312	0.9472	0.7032	0.9561	0.9420	0.9400	0.9488	0.9421	0.1949
77	0.9428	0.9586	0.9248	0.9686	0.9263	0.7263	0.9289	0.8996	0.9440	0.6880	0.9136	0.6607	0.9001	0.7584	0.9460	0.9230	0.9166	0.9276	0.9230	0.1444
78	0.9534	0.9800	0.9062	0.9593	0.9483	0.6201	0.8621	0.8207	0.9868	0.6779	0.9473	0.6387	0.9416	0.7133	0.9566	0.9623	0.9483	0.9567	0.9530	0.1913
79	0.9668	0.9813	0.9216	0.9872	0.9360	0.7298	0.9163	0.8837	0.9669	0.6733	0.9298	0.6406	0.9224	0.7576	0.9800	0.9362	0.9366	0.9416	0.9388	0.1884
80	0.9846	0.9381	0.8458	0.9203	0.9828	0.5286	0.7813	0.7539	0.9854	0.6307	0.9811	0.4801	0.9196	0.6537	0.9846	0.9838	0.9828	0.9846	0.9834	0.1470
81	0.9240	0.8669	0.9271	0.9684	0.9081	0.7217	0.9339	0.9007	0.9271	0.8446	0.8884	0.8736	0.9297	0.8287	0.9283	0.9113	0.9006	0.9127	0.9125	0.1953
82	0.9843	0.9719	0.9081	0.9711	0.9312	0.6778	0.8003	0.8581	0.9832	0.6121	0.9258	0.5870	0.9618	0.7778	0.9576	0.9368	0.9320	0.9408	0.9400	0.1809
83	0.9589	0.9881	0.9816	0.9780	0.9087	0.6644	0.8863	0.8211	0.9586	0.6087	0.9368	0.5474	0.9686	0.7410	0.9832	0.9478	0.9453	0.9488	0.9487	0.2132
84	0.9483	0.9817	0.9214	0.9797	0.9279	0.7156	0.9160	0.8729	0.9488	0.8339	0.9218	0.8111	0.9368	0.7833	0.9634	0.9321	0.9276	0.9347	0.9319	0.1858
85	0.9497	0.9881	0.8172	0.9860	0.9330	0.7231	0.9085	0.8641	0.9486	0.8486	0.9298	0.8199	0.9497	0.7794	0.9635	0.9368	0.9369	0.9377	0.9369	0.2381
86	0.9384	0.9766	0.8272	0.9757	0.9201	0.7273	0.9248	0.8880	0.9398	0.8517	0.9132	0.8509	0.9371	0.7978	0.9436	0.9241	0.9186	0.9281	0.9251	0.2037
87	0.9696	0.9778	0.9106	0.9852	0.9479	0.6397	0.8782	0.8430	0.9810	0.6902	0.9466	0.5799	0.9629	0.7560	0.9636	0.9546	0.9458	0.9566	0.9563	0.2013
88	0.9828	0.9824	0.9186	0.9841	0.9484	0.6741	0.8784	0.8436	0.9814	0.6981	0.9479	0.5888	0.9662	0.7568	0.9663	0.9638	0.9614	0.9661	0.9563	0.2158
89	0.9867	0.9806	0.9096	0.9774	0.9814	0.6474	0.8864	0.8282	0.9844	0.8460	0.9508	0.5554	0.9596	0.7366	0.9702	0.9640	0.9548	0.9663	0.9588	0.1994
90	0.9664	0.9881	0.9180	0.9771	0.9383	0.6998	0.8975	0.8657	0.9555	0.8408	0.9366	0.5997	0.9557	0.7891	0.9804	0.9443	0.9423	0.9468	0.9448	0.2208
91	0.9411	0.9793	0.9158	0.9794	0.9217	0.7277	0.9151	0.8714	0.9407	0.8326	0.9166	0.8296	0.9386	0.7835	0.9480	0.9253	0.9248	0.9278	0.9262	0.2209
92	0.9448	0.9561	0.9303	0.9606	0.9281	0.6842	0.8166	0.8666	0.9486	0.8509	0.9238	0.8404	0.9443	0.8252	0.9483	0.9379	0.9203	0.9363	0.9388	0.1628
93	0.9283	0.9806	0.9362	0.9634	0.9191	0.7215	0.9278	0.9031	0.9328	0.8933	0.9137	0.8970	0.9327	0.8472	0.9323	0.9214	0.9129	0.9227	0.9239	0.2300
94	0.9358	0.9828	0.9162	0.9824	0.9131	0.7282	0.9152	0.8717	0.9345	0.8294	0.9068	0.8256	0.9336	0.7744	0.9369	0.9178	0.9139	0.9187	0.9191	0.2039
95	0.9408	0.9866	0.9228	0.9837	0.9248	0.7201	0.9098	0.8716	0.9414	0.8663	0.9204	0.8320	0.9477	0.7862	0.9456	0.9286	0.9258	0.9305	0.9305	0.2291
96	0.9848	0.9826	0.8843	0.9891	0.9419	0.6311	0.8629	0.8199	0.9812	0.8019	0.9368	0.5256	0.9563	0.7181	0.9691	0.9617	0.9451	0.9633	0.9614	0.1619
97	0.9438	0.9757	0.9180	0.9594	0.9371	0.6604	0.8771	0.8421	0.9478	0.8651	0.9380	0.5462	0.9800	0.7871	0.9489	0.9436	0.9362	0.9448	0.9447	0.2331
98	0.9838	0.9822	0.8096	0.9891	0.9440	0.7148	0.9675	0.8484	0.9843	0.8444	0.9408	0.8009	0.9529	0.7488	0.9854	0.9464	0.9510	0.9478	0.9475	0.2377
99	0.9819	0.9834	0.9123	0.9864	0.9458	0.6844	0.8828	0.8458	0.9508	0.8552	0.9418	0.5841	0.9523	0.7366	0.9852	0.9494	0.9478	0.9516	0.9508	0.2072
100	0.9811	0.9844	0.9139	0.9743	0.9437	0.6554	0.8662	0.8483	0.9808	0.8391	0.9403	0.5755	0.9589	0.7578	0.9854	0.9814	0.9433	0.9533	0.9521	0.1802
101	0.9487	0.9752	0.9106	0.9701	0.9283	0.6864	0.9081	0.8636	0.9481	0.8117	0.9204	0.6048	0.9464	0.7903	0.9827	0.9337	0.9277	0.9360	0.9337	0.1884
102	0.9291	0.9843	0.9060	0.9831	0.9078	0.6816	0.9030	0.8668	0.9304	0.8021	0.9043	0.6000	0.9450	0.7846	0.9333	0.9174	0.9087	0.9188	0.9178	0.1991
103	0.9158	0.9484	0.9446	0.9619	0.9110	0.7388	0.9279	0.9150	0.9208	0.7412	0.9038	0.7318	0.8830	0.8272	0.9204	0.9062	0.9006	0.9088	0.9116	0.2080
104	0.9708	0.9875	0.9373	0.9588	0.9664	0.6315	0.8891	0.8660	0.9732	0.8648	0.9620	0.5801	0.9301	0.7744	0.9743	0.9842	0.9474	0.9646	0.9638	0.1028
105	0.9810	0.9808	0.9012	0.9804	0.9401	0.6792	0.8739	0.8327	0.9563	0.8243	0.9378	0.6720	0.9588	0.7417	0.9842	0.9470	0.9475	0.9477	0.9483	0.2088
106	0.9474	0.9801	0.9404	0.9741	0.9447	0.6886	0.9031	0.8782	0.9628	0.7293	0.9428	0.6641	0.9477	0.8091	0.9622	0.9462	0.9375	0.9478	0.9486	0.2337
107	0.9480	0.9803	0.9218	0.9756	0.9320	0.6867	0.9104	0.8731	0.9480	0.8564	0.9271	0.6328	0.9537	0.7988	0.9621	0.9375	0.9306	0.9391	0.9389	0.2157
108	0.9343	0.9862	0.8978	0.9708	0.9052	0.7240	0.9013	0.8607	0.9292	0.8886	0.9007	0.6088	0.9362	0.7726	0.9367	0.9123	0.9131	0.9128	0.9122	0.2141

INDEX	41	42	43	44	45	46	47	48	49	50	51	52	53	54	56	56	57	58	59	60
108	0.9663	0.9526	0.9872	0.9629	0.8703	0.7981	0.9207	0.9664	0.8946	0.5867	0.9812	0.8522	0.9060	0.7687	0.9014	0.8705	0.8789	0.8740	0.8706	0.2486
110	0.9374	0.9566	0.9329	0.9601	0.9213	0.7036	0.9427	0.9060	0.8430	0.8613	0.9120	0.8547	0.9170	0.8188	0.9412	0.9256	0.9112	0.9291	0.9250	0.1536
111	0.8642	0.9344	0.9438	0.9446	0.8689	0.7730	0.9402	0.9206	0.8642	0.7884	0.8823	0.7728	0.8860	0.8715	0.8890	0.8811	0.8748	0.8842	0.8842	0.2797
112	0.9636	0.9742	0.9208	0.9609	0.9686	0.8188	0.8663	0.8302	0.9863	0.8630	0.9801	0.5654	0.9420	0.7566	0.9673	0.9636	0.9564	0.9636	0.9661	0.1813
114	0.9611	0.9747	0.9104	0.9654	0.9295	0.6646	0.8887	0.8478	0.9607	0.8101	0.9258	0.5582	0.9394	0.7407	0.9658	0.9379	0.9291	0.9408	0.9372	0.1463
116	0.9429	0.9580	0.9464	0.9526	0.9412	0.6606	0.9068	0.8648	0.9507	0.7161	0.9384	0.6417	0.9422	0.8213	0.9488	0.9482	0.9288	0.9480	0.9473	0.1877
116	0.9201	0.9150	0.9486	0.9079	0.9222	0.6283	0.9038	0.9043	0.9302	0.7364	0.9179	0.6947	0.8911	0.8456	0.9248	0.9281	0.9018	0.9270	0.9286	0.1280
118	0.9600	0.9600	0.9421	0.9681	0.9398	0.6279	0.8668	0.8102	0.9572	0.5978	0.9376	0.5104	0.9483	0.7102	0.9637	0.9462	0.9433	0.9602	0.9473	0.1882
120	0.8091	0.8413	0.9443	0.9521	0.8938	0.7458	0.9566	0.9325	0.9155	0.8824	0.8828	0.7141	0.8802	0.5231	0.9142	0.8942	0.8808	0.8978	0.8961	0.1436
121	0.9304	0.9808	0.9128	0.9417	0.9022	0.6925	0.9070	0.8718	0.9238	0.8227	0.8936	0.6048	0.8908	0.7730	0.9282	0.9114	0.8980	0.8092	0.9108	0.1631
122	0.9083	0.9582	0.8836	0.9142	0.8798	0.6114	0.8864	0.8128	0.9098	0.5313	0.8877	0.5115	0.8457	0.7100	0.9123	0.8918	0.8758	0.8941	0.8881	0.0990
123	0.8634	0.8632	0.8746	0.9006	0.8563	0.5833	0.8628	0.8027	0.8858	0.5874	0.8536	0.5219	0.8758	0.7160	0.8841	0.8697	0.8480	0.8772	0.8884	0.0410
124	0.9168	0.9128	0.9100	0.9343	0.8878	0.6317	0.9006	0.8404	0.9172	0.5911	0.8838	0.5646	0.8971	0.7413	0.9160	0.8998	0.8801	0.9062	0.8873	0.0600
126	0.9284	0.9524	0.9006	0.9408	0.9027	0.6606	0.9021	0.8628	0.9313	0.5766	0.8887	0.5816	0.8986	0.7439	0.9330	0.9123	0.8980	0.9148	0.9100	0.0733
127	0.9218	0.9714	0.9333	0.9864	0.9118	0.7589	0.9562	0.8944	0.9286	0.6990	0.8998	0.6636	0.9128	0.7763	0.9286	0.9052	0.9077	0.9147	0.9080	0.2040
128	0.9246	0.9478	0.8987	0.9798	0.8947	0.7317	0.9026	0.8336	0.9196	0.6008	0.8922	0.6025	0.9336	0.7407	0.9233	0.8998	0.9034	0.9087	0.8987	0.1950
129	0.9086	0.9451	0.9108	0.9411	0.8908	0.7348	0.9212	0.8880	0.9116	0.6364	0.8908	0.6398	0.8948	0.7036	0.8880	0.8710	0.8500	0.8730	0.8983	0.0325
130	0.9148	0.9560	0.9386	0.9546	0.9034	0.7017	0.9300	0.8921	0.9225	0.6917	0.8917	0.6831	0.8956	0.8016	0.9221	0.9040	0.8882	0.9080	0.9045	0.1200
132	0.8787	0.9341	0.8932	0.9413	0.8569	0.7898	0.9222	0.8798	0.8779	0.6234	0.8442	0.6796	0.8636	0.7896	0.8819	0.8641	0.8581	0.8582	0.8564	0.2113
133	0.8846	0.9160	0.8923	0.8978	0.8752	0.6140	0.8833	0.8418	0.9026	0.6794	0.8840	0.5515	0.8807	0.7384	0.8984	0.8831	0.8598	0.8846	0.8784	0.0300
134	0.8822	0.8800	0.8806	0.9196	0.8388	0.7256	0.8987	0.8486	0.8821	0.6211	0.8322	0.6993	0.8858	0.7727	0.8814	0.8308	0.8384	0.8477	0.8420	0.1710
136	0.9035	0.9216	0.8911	0.9166	0.8786	0.6219	0.9021	0.8488	0.9092	0.5632	0.8877	0.5638	0.8856	0.7322	0.9092	0.8897	0.8821	0.8920	0.8847	0.0194
136	0.9048	0.9547	0.8913	0.9528	0.8768	0.7488	0.9131	0.8625	0.9047	0.5881	0.8878	0.6076	0.8904	0.7327	0.9083	0.8777	0.8816	0.8940	0.8780	0.1680
137	0.8898	0.9411	0.8805	0.9446	0.8436	0.6129	0.8909	0.8747	0.8998	0.5808	0.8317	0.5884	0.8483	0.7848	0.8758	0.8443	0.8483	0.8436	0.8480	0.2477
138	0.9364	0.9804	0.8803	0.9505	0.9103	0.8988	0.8977	0.8522	0.9336	0.5829	0.8988	0.5836	0.9014	0.7297	0.9422	0.9141	0.9103	0.9178	0.9151	0.1166
139	0.9281	0.9632	0.9186	0.9576	0.9131	0.6788	0.9137	0.8649	0.9310	0.6513	0.9039	0.6111	0.9071	0.7704	0.9342	0.9170	0.9081	0.9181	0.9153	0.1475
140	0.8980	0.9210	0.8774	0.9192	0.8884	0.6386	0.8875	0.8241	0.9002	0.5406	0.8556	0.5304	0.8606	0.7082	0.9014	0.8781	0.8686	0.8848	0.8736	0.0400
141	0.9182	0.8412	0.9073	0.9466	0.9002	0.6988	0.9108	0.8787	0.9187	0.6480	0.8928	0.6410	0.8920	0.7542	0.9215	0.9028	0.8804	0.8048	0.8042	0.1374
142	0.9166	0.8864	0.8208	0.9641	0.8038	0.7805	0.9198	0.8796	0.9172	0.6848	0.8888	0.6896	0.9019	0.7633	0.9217	0.8980	0.9000	0.9037	0.8884	0.2273
143	0.8887	0.8638	0.8875	0.8958	0.8884	0.5834	0.8079	0.8708	0.8808	0.5488	0.8432	0.5807	0.8382	0.7308	0.8892	0.8713	0.8384	0.8756	0.8886	-0.0438
144	0.9081	0.9024	0.8773	0.9124	0.8817	0.5531	0.8886	0.8162	0.9086	0.5582	0.8718	0.4857	0.8581	0.6844	0.9107	0.8631	0.8700	0.8893	0.8823	0.0058
146	0.8800	0.8664	0.8081	0.9470	0.8306	0.6196	0.8918	0.8477	0.8831	0.6189	0.9246	0.5527	0.9252	0.7427	0.9550	0.9400	0.8236	0.9440	0.9366	0.0988
146	0.8606	0.8294	0.8797	0.9471	0.8428	0.6002	0.8062	0.8893	0.8827	0.6320	0.8332	0.6727	0.8406	0.7311	0.8888	0.8367	0.8482	0.8421	0.8381	0.2280
147	0.8765	0.8958	0.9037	0.9229	0.8679	0.8897	0.8977	0.8038	0.8803	0.8528	0.8454	0.8841	0.8314	0.7878	0.8793	0.8588	0.8448	0.8814	0.8588	0.0819
148	0.8738	0.8983	0.8878	0.9140	0.8628	0.7179	0.8328	0.8884	0.8797	0.8244	0.8408	0.8791	0.8308	0.7950	0.8786	0.8548	0.8384	0.8546	0.8521	0.1056
149	0.8222	0.8884	0.8117	0.8828	0.8063	0.7158	0.8010	0.8554	0.8230	0.8340	0.8001	0.8088	0.8186	0.7502	0.8278	0.8081	0.8068	0.8114	0.8088	0.2013
150	0.8046	0.8805	0.8128	0.8656	0.8133	0.8825	0.8101	0.8888	0.8366	0.8180	0.8051	0.5804	0.8881	0.7446	0.8386	0.8171	0.8081	0.8201	0.8161	0.1162
151	0.7928	0.8383	0.8873	0.8648	0.7780	0.7588	0.8541	0.8288	0.8048	0.8480	0.7583	0.7812	0.7488	0.8180	0.7984	0.7730	0.7533	0.7786	0.7728	0.0853
152	0.9001	0.8828	0.8828	0.8785	0.8712	0.8057	0.8418	0.7979	0.9080	0.5208	0.8654	0.4823	0.8680	0.8908	0.9037	0.8818	0.8588	0.8817	0.8878	-0.0448
153	0.8720	0.8732	0.8841	0.8704	0.8408	0.5843	0.8888	0.8148	0.8758	0.5111	0.8315	0.4888	0.8208	0.8808	0.8781	0.8583	0.8238	0.8579	0.8618	-0.0538
154	0.8481	0.8312	0.8327	0.8387	0.8208	0.4847	0.8343	0.7800	0.8544	0.4830	0.8080	0.4438	0.7848	0.8841	0.8538	0.8364	0.8018	0.8421	0.8329	-0.0829
156	0.8732	0.8884	0.8636	0.8880	0.8378	0.5800	0.8888	0.8182	0.8783	0.4880	0.8270	0.4803	0.8186	0.6791	0.8788	0.8529	0.8274	0.8588	0.8473	-0.0324
156	0.8170	0.8868	0.8315	0.8253	0.7882	0.8201	0.8807	0.8273	0.8117	0.5887	0.7771	0.6870	0.7873	0.8878	0.8200	0.7798	0.7979	0.7881	0.7819	0.2381
157	0.8641	0.8882	0.8480	0.8808	0.8613	0.4880	0.8403	0.7975	0.8679	0.4848	0.8428	0.4473	0.8331	0.8795	0.8888	0.8728	0.8388	0.8747	0.8871	-0.0783
158	0.9488	0.8728	0.8878	0.8848	0.8254	0.6830	0.8777	0.8385	0.8488	0.8088	0.8196	0.5884	0.8150	0.7088	0.8832	0.8304	0.8282	0.8347	0.8308	0.1308
159	0.8328	0.8708	0.8447	0.8000	0.8310	0.6838	0.8708	0.8353	0.8381	0.8887	0.8219	0.7008	0.8713	0.8137	0.8383	0.8288	0.8248	0.8333	0.8332	0.3218
160	0.8393	0.8707	0.8425	0.8738	0.8108	0.6846	0.8315	0.7712	0.8284	0.5828	0.8086	0.8088	0.8364	0.8831	0.8411	0.8158	0.8270	0.8172	0.8180	0.2388
AFM1	0.8833	0.8138	0.8173	0.8388	0.8838	0.7888	0.8442	0.8283	0.8887	0.7258	0.8873	0.7487	0.8481	0.7883	0.8884	0.8747	0.8888	0.8800	0.8787	0.1748
AFM2	0.8180	0.8470	0.7170	0.8743	0.8080	0.8029	0.7422	0.7884	0.8888	0.8824	0.8744	0.8308	0.8360	0.8284	0.8881	0.8382	0.8770	0.8708	0.8708	0.4032
AFM3	0.8443	0.8847	0.8002	0.8818	0.8233	0.7007	0.8803	0.8808	0.8404	0.8271	0.8208	0.8308	0.8802	0.8084	0.8482	0.8304	0.8281	0.8300	0.8318	0.2513
AFM4	0.8301	0.8777	0.8347	0.8022	0.8114	0.7370	0.8874	0.8232	0.8308	0.8843	0.7984	0.8838	0.8228	0.7838	0.8328	0.8073	0.8108	0.8087	0.8087	0.2191

INDEX	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70
55																				
56																				
57																				
58																				
59																				
60																				
61																				
62	0.6180																			
63	0.7866	0.9439																		
64	0.8351	0.9066	0.2830																	
65	0.6949	0.6840	0.2523	0.7256																
66	0.7048	0.9309	0.2859	0.9240	0.8128															
67	0.5904	0.9568	0.2791	0.8763	0.7322	0.9488														
68	0.7145	0.9764	0.2933	0.9624	0.7499	0.9654	0.9487													
69	0.4348	0.2944	0.1388	0.4029	0.7911	0.5139	0.3733	0.3808												
70	0.6868	0.9668	0.2788	0.8721	0.7217	0.9608	1.0008	0.9504	0.3811											
71	0.5667	0.9358	0.2602	0.9291	0.5304	0.8640	0.8884	0.9460	0.1812	0.6883										
72	0.6916	0.9454	0.2928	0.9037	0.8407	0.9682	0.9617	0.9683	0.4578	0.9571	0.9564									
73	0.4396	0.5725	0.1438	0.6277	0.3226	0.6986	0.5806	0.6024	0.2504	0.6101	0.6236	0.5329								
74	0.6458	0.9810	0.2936	0.9270	0.7577	0.9677	0.9583	0.9823	0.3984	0.9643	0.9208	0.9703	0.5364							
75	0.5661	0.9652	0.2778	0.8766	0.7198	0.9441	1.0008	0.9497	0.3553	0.9996	0.9629	0.9564	0.5801	0.9581						
76	0.6676	0.9727	0.2968	0.9257	0.7784	0.9803	0.9456	0.9483	0.3676	0.9418	0.9087	0.9536	0.5077	0.9081	0.9416					
77	0.7748	0.9067	0.2932	0.9188	0.8806	0.9674	0.9248	0.9497	0.5282	0.9162	0.8150	0.9635	0.5120	0.9481	0.8166	0.9468				
78	0.6231	0.9731	0.2914	0.9081	0.7741	0.9508	0.9622	0.9901	0.4123	0.9490	0.9132	0.9630	0.6262	0.9661	0.9487	0.9606	0.9265			
79	0.7778	0.9388	0.2979	0.9443	0.8565	0.9686	0.9407	0.9717	0.4915	0.9537	0.8658	0.9652	0.5333	0.9584	0.9348	0.9667	0.9644	0.9907		
80	0.6730	0.9612	0.2748	0.8606	0.7123	0.9594	1.0000	0.9420	0.3603	0.9996	0.8863	0.9615	0.5822	0.9527	0.9092	0.9361	0.9011	0.9504	0.9266	
81	0.8294	0.9203	0.2980	0.9291	0.8727	0.9632	0.9046	0.9582	0.5068	0.8986	0.8377	0.9521	0.5406	0.9433	0.8989	0.9584	0.9749	0.9578	0.9771	0.8688
82	0.7987	0.9643	0.2978	0.9389	0.8284	0.9678	0.9403	0.9600	0.4323	0.9363	0.8795	0.9619	0.5730	0.9652	0.9357	0.9707	0.9772	0.9657	0.9847	0.8271
83	0.7311	0.9798	0.2978	0.9446	0.7812	0.9633	0.9610	0.9845	0.3817	0.9479	0.9214	0.9737	0.5687	0.9861	0.9475	0.9682	0.9841	0.9778	0.9748	0.9400
84	0.7696	0.9606	0.3008	0.9387	0.8463	0.9653	0.9332	0.9782	0.4682	0.9264	0.8715	0.9628	0.4977	0.9760	0.9283	0.9626	0.9783	0.9698	0.9880	0.9184
85	0.7743	0.9818	0.3011	0.9523	0.8285	0.9683	0.9357	0.9848	0.4678	0.9300	0.8909	0.9730	0.5292	0.9798	0.9319	0.9832	0.9864	0.9694	0.9835	0.8218
86	0.8078	0.9390	0.3011	0.9432	0.8800	0.9630	0.9216	0.9725	0.4901	0.9158	0.9588	0.9741	0.5338	0.9648	0.9162	0.9726	0.9820	0.9573	0.9899	0.8082
87	0.7091	0.9723	0.2955	0.9242	0.8020	0.9692	0.9525	0.9875	0.4325	0.9508	0.9101	0.9760	0.5839	0.9844	0.9473	0.9852	0.9655	0.9858	0.9880	0.9427
88	0.7306	0.9814	0.3001	0.9346	0.8106	0.9739	0.9532	0.9871	0.4439	0.9495	0.9016	0.9792	0.5637	0.9806	0.9464	0.9884	0.9866	0.9807	0.9838	0.9423
89	0.7112	0.9652	0.2966	0.9037	0.7936	0.9696	0.9592	0.9891	0.4136	0.9559	0.9056	0.9801	0.5672	0.9928	0.9554	0.9813	0.9536	0.9834	0.9756	0.9492
90	0.7582	0.9674	0.3015	0.9368	0.8233	0.9610	0.9439	0.9840	0.4498	0.9388	0.8938	0.9769	0.5271	0.9836	0.9402	0.9868	0.9717	0.9749	0.9821	0.9514
91	0.8002	0.9468	0.3007	0.9487	0.8390	0.9617	0.9254	0.9784	0.4928	0.9184	0.8720	0.9664	0.5228	0.9586	0.9206	0.9750	0.9703	0.9580	0.9827	0.9101
92	0.7830	0.9401	0.2969	0.9138	0.8908	0.9668	0.9294	0.9836	0.4914	0.9265	0.8648	0.9757	0.5706	0.9533	0.9242	0.9634	0.9783	0.9600	0.9757	0.9171
93	0.8297	0.9278	0.2973	0.9319	0.8699	0.9644	0.9120	0.9597	0.5391	0.9074	0.8380	0.9667	0.6815	0.9478	0.9098	0.9503	0.9714	0.9372	0.9757	0.8974
94	0.7969	0.9461	0.3013	0.9504	0.8427	0.9638	0.9184	0.9784	0.4584	0.9116	0.8874	0.9675	0.5072	0.9588	0.9134	0.9756	0.9731	0.9593	0.9868	0.9028
95	0.7915	0.9563	0.3015	0.9458	0.8372	0.9607	0.9268	0.9810	0.4697	0.9210	0.8832	0.9681	0.5330	0.9781	0.9218	0.9829	0.9689	0.9526	0.9838	0.9122
96	0.7028	0.9772	0.2966	0.9253	0.7868	0.9623	0.9658	0.9891	0.3758	0.9527	0.9044	0.9838	0.5448	0.9875	0.9516	0.9902	0.9686	0.9816	0.9755	0.9458
97	0.7091	0.9723	0.2969	0.9181	0.7999	0.9631	0.9378	0.9779	0.4441	0.9345	0.9033	0.9548	0.5494	0.9823	0.9536	0.9959	0.9418	0.9790	0.9580	0.9272
98	0.7713	0.9516	0.3017	0.9493	0.8158	0.9661	0.9493	0.9842	0.4436	0.9436	0.8948	0.9757	0.5388	0.9630	0.9481	0.9841	0.9769	0.9709	0.9902	0.9371
99	0.7238	0.9723	0.2994	0.9394	0.8107	0.9702	0.9517	0.9886	0.4338	0.9472	0.9011	0.9824	0.5419	0.9908	0.9470	0.9907	0.9878	0.9853	0.9887	0.9400
100	0.7292	0.9719	0.2968	0.9318	0.8141	0.9691	0.9518	0.9866	0.4254	0.9479	0.8998	0.9834	0.5671	0.9869	0.9483	0.9894	0.9877	0.9825	0.9911	0.9401
101	0.7900	0.9603	0.2994	0.9430	0.8339	0.9618	0.9341	0.9782	0.4402	0.9291	0.8707	0.9758	0.5441	0.9678	0.9298	0.9753	0.9742	0.9657	0.9841	0.9198
102	0.7829	0.9481	0.2969	0.9318	0.8224	0.9653	0.9149	0.9785	0.4312	0.9099	0.8754	0.9580	0.5441	0.9637	0.9100	0.9887	0.9547	0.9481	0.9851	0.9001
103	0.8119	0.9668	0.2945	0.9067	0.8569	0.9533	0.9671	0.9277	0.5017	0.8911	0.7959	0.9492	0.5366	0.9298	0.8907	0.9323	0.9777	0.9272	0.9762	0.8628
104	0.7177	0.9606	0.2986	0.9534	0.8550	0.9678	0.9560	0.9837	0.4792	0.9557	0.8493	0.9932	0.5225	0.9714	0.9548	0.9757	0.9846	0.9638	0.9843	0.9484
105	0.7540	0.9720	0.3002	0.9437	0.8003	0.9636	0.9498	0.9889	0.4120	0.9457	0.9027	0.9756	0.5818	0.9828	0.9481	0.9848	0.9806	0.9743	0.9844	0.9368
106	0.7580	0.9620	0.2962	0.9229	0.8438	0.9742	0.9375	0.9720	0.5224	0.9343	0.8834	0.9866	0.5732	0.9788	0.9321	0.9764	0.9646	0.9752	0.9769	0.9260
107	0.7620	0.9658	0.2986	0.9466	0.8375	0.9661	0.9348	0.9840	0.4706	0.9304	0.8838	0.9728	0.5728	0.9734	0.9282	0.9772	0.9718	0.9679	0.9840	0.9207
108	0.8287	0.9437	0.2969	0.9446	0.8291	0.9458	0.9142	0.9958	0.4366	0.9077	0.8675	0.9638	0.5196	0.9519	0.9114	0.9819	0.9788	0.9307	0.9808	0.8988

INCEI	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
109	0.8646	0.8966	0.2967	0.9486	0.8426	0.9212	0.8746	0.9470	0.4887	0.8646	0.8254	0.8399	0.4807	0.9316	0.8867	0.9436	0.9699	0.9118	0.9878	0.8644
110	0.7883	0.9229	0.2262	0.8248	0.8772	0.8523	0.8203	0.9533	0.5048	0.8141	0.8344	0.8718	0.5227	0.8528	0.9141	0.9678	0.9725	0.9458	0.9794	0.9048
111	0.8216	0.8847	0.2900	0.9066	0.8934	0.9402	0.8954	0.9148	0.6400	0.8492	0.7807	0.9196	0.5586	0.9158	0.8532	0.9129	0.9498	0.9006	0.9634	0.9481
112	0.8841	0.9801	0.2966	0.9309	0.8025	0.9804	0.9487	0.9702	0.4527	0.9464	0.8822	0.9704	0.5476	0.9818	0.9564	0.9767	0.9668	0.9736	0.9836	0.9618
113	0.8470	0.9685	0.2937	0.9103	0.7405	0.9472	0.9847	0.9762	0.3832	0.9617	0.9199	0.9687	0.5197	0.9021	0.9838	0.9681	0.9390	0.9799	0.9476	0.9677
114	0.7291	0.9690	0.2979	0.9168	0.8198	0.9653	0.9400	0.9780	0.4141	0.9344	0.8739	0.9606	0.5134	0.9753	0.9344	0.9674	0.9667	0.9693	0.9758	0.9273
115	0.8649	0.9039	0.2963	0.9067	0.8618	0.9438	0.8946	0.9357	0.5126	0.8478	0.9228	0.9561	0.5243	0.9240	0.9910	0.9357	0.9812	0.9105	0.9776	0.9777
116	0.7156	0.9619	0.2962	0.9091	0.8484	0.9707	0.9548	0.9864	0.5139	0.9328	0.8672	0.9671	0.5696	0.9748	0.9287	0.9748	0.9687	0.9768	0.9891	0.9535
117	0.7752	0.9212	0.2948	0.8945	0.8806	0.9668	0.9383	0.9443	0.6288	0.9336	0.8119	0.9810	0.5473	0.9425	0.9324	0.9481	0.9806	0.9292	0.9875	0.9268
118	0.7567	0.9925	0.2998	0.8824	0.8880	0.9545	0.9086	0.9103	0.5906	0.9057	0.7772	0.9456	0.5829	0.9139	0.9011	0.9197	0.9680	0.9201	0.9507	0.9548
119	0.8858	0.9793	0.2956	0.9174	0.7769	0.9617	0.9628	0.9860	0.3658	0.9489	0.9021	0.9773	0.5194	0.9694	0.9491	0.9901	0.9611	0.9773	0.9955	0.9423
120	0.8256	0.8847	0.2949	0.9038	0.9174	0.8408	0.8863	0.9309	0.5736	0.8777	0.7799	0.9618	0.4825	0.9257	0.8796	0.9353	0.9824	0.9174	0.9750	0.9456
121	0.7388	0.9290	0.2913	0.9143	0.8329	0.9187	0.9081	0.9611	0.4878	0.9001	0.8328	0.9490	0.4838	0.9452	0.9018	0.9664	0.9498	0.9503	0.9609	0.9825
122	0.7041	0.9146	0.2843	0.8879	0.8027	0.8953	0.9583	0.9446	0.3697	0.8674	0.8376	0.9584	0.4347	0.9242	0.8912	0.9427	0.9367	0.9371	0.9319	0.8808
123	0.8567	0.8641	0.2768	0.8438	0.7961	0.8915	0.9532	0.9066	0.3937	0.8615	0.7818	0.9223	0.4473	0.9210	0.8629	0.9136	0.8475	0.9048	0.8966	0.8570
124	0.7064	0.8658	0.2873	0.8721	0.8388	0.9238	0.8962	0.9295	0.4363	0.8856	0.7947	0.9587	0.4487	0.9471	0.8921	0.9400	0.9293	0.9285	0.9349	0.8853
125	0.7329	0.9206	0.2928	0.9085	0.8483	0.9184	0.9144	0.9629	0.4231	0.9048	0.8445	0.9632	0.4383	0.9454	0.9088	0.9622	0.9673	0.9587	0.9607	0.9579
126	0.7947	0.9087	0.2992	0.9087	0.8747	0.9256	0.9056	0.9516	0.5361	0.8948	0.8100	0.9758	0.4750	0.9741	0.8964	0.9528	0.9676	0.9585	0.9697	0.9470
127	0.7843	0.9086	0.2960	0.9373	0.8188	0.9386	0.9048	0.9550	0.4333	0.8938	0.8418	0.9652	0.4680	0.9648	0.9004	0.9662	0.9368	0.9377	0.9640	0.9668
128	0.6788	0.8773	0.2748	0.8442	0.8045	0.8786	0.8719	0.9054	0.4009	0.8536	0.7870	0.9373	0.4288	0.8904	0.8683	0.9068	0.9197	0.9032	0.9090	0.8573
129	0.7566	0.9071	0.2918	0.9132	0.8606	0.9167	0.8923	0.9516	0.5000	0.8813	0.8241	0.9558	0.4520	0.9300	0.8846	0.9408	0.9478	0.9357	0.9643	0.8742
130	0.7806	0.8946	0.2923	0.8980	0.8871	0.9286	0.8980	0.9208	0.5378	0.8606	0.8196	0.9495	0.4700	0.9511	0.8902	0.9368	0.9697	0.9478	0.9725	0.9533
131	0.8782	0.9016	0.2989	0.8720	0.8619	0.9283	0.9229	0.9508	0.4283	0.9184	0.8213	0.9650	0.4614	0.9821	0.9163	0.9458	0.9588	0.9539	0.9700	0.9108
132	0.8328	0.8787	0.2985	0.9284	0.8526	0.9018	0.8653	0.9284	0.5066	0.8446	0.7971	0.9158	0.4679	0.9028	0.8483	0.9152	0.9446	0.9005	0.9666	0.8348
133	0.8729	0.8914	0.2810	0.8523	0.8378	0.8975	0.8909	0.9008	0.4329	0.8731	0.7875	0.9402	0.4215	0.9111	0.8729	0.9230	0.9039	0.9288	0.9668
134	0.8136	0.8250	0.2790	0.8816	0.8417	0.9031	0.8378	0.8865	0.5098	0.8276	0.7471	0.9081	0.4993	0.8878	0.8316	0.8812	0.9096	0.8950	0.9140	0.8212
135	0.7172	0.8815	0.2950	0.8879	0.8411	0.9047	0.8878	0.9181	0.4228	0.8808	0.7953	0.9539	0.4422	0.8929	0.8600	0.9243	0.9438	0.9217	0.9379	0.8712
136	0.7751	0.9077	0.2941	0.9015	0.8351	0.9080	0.8648	0.9477	0.4448	0.8731	0.8340	0.9458	0.4256	0.8426	0.8783	0.9521	0.9498	0.9304	0.9806	0.8982
137	0.8416	0.8758	0.2984	0.9363	0.8398	0.8783	0.8444	0.9200	0.4672	0.8331	0.7904	0.9079	0.4308	0.9003	0.8403	0.9146	0.9078	0.8986	0.9396	0.8248
138	0.7736	0.9308	0.2928	0.9183	0.8317	0.9363	0.9203	0.9528	0.4362	0.9131	0.8228	0.9737	0.4897	0.8408	0.9151	0.9547	0.9722	0.9083	0.9783	0.9063
139	0.7222	0.9469	0.2943	0.9211	0.8446	0.9393	0.9153	0.9672	0.4623	0.9093	0.8422	0.9608	0.4828	0.8424	0.9083	0.9719	0.9630	0.9706	0.9884	0.9090
140	0.7184	0.9087	0.2833	0.8784	0.8198	0.8867	0.8829	0.9087	0.3910	0.8759	0.7958	0.9469	0.4424	0.9200	0.8749	0.9353	0.9387	0.9186	0.9387	0.8867
141	0.7781	0.8894	0.2908	0.9004	0.8592	0.9403	0.9002	0.9332	0.4898	0.8953	0.7980	0.9571	0.5142	0.8348	0.8941	0.9384	0.9808	0.9313	0.9707	0.8864
142	0.7767	0.9162	0.2986	0.9309	0.8564	0.9318	0.8981	0.9530	0.5248	0.8998	0.8437	0.9494	0.4858	0.8518	0.8921	0.9562	0.9871	0.9621	0.9706	0.8818
143	0.7087	0.8607	0.2773	0.8380	0.8608	0.8918	0.8697	0.8914	0.4439	0.8615	0.7394	0.9442	0.4239	0.8822	0.8586	0.8951	0.9303	0.8962	0.9239	0.8518
144	0.6418	0.8032	0.2796	0.8483	0.7994	0.9022	0.8957	0.9277	0.3787	0.8907	0.8190	0.9365	0.4428	0.9138	0.8879	0.9278	0.9290	0.9187	0.9198	0.8820
145	0.8661	0.9496	0.2926	0.8975	0.8268	0.9448	0.9396	0.9603	0.4204	0.9080	0.8460	0.9764	0.5098	0.9732	0.9539	0.9738	0.9531	0.9698	0.9829	0.9288
146	0.8140	0.8648	0.2894	0.9230	0.8410	0.8799	0.8368	0.9149	0.5081	0.8270	0.7808	0.9027	0.4122	0.9084	0.8532	0.9110	0.9366	0.8955	0.9448	0.8187
147	0.8174	0.8422	0.2842	0.8779	0.8082	0.8968	0.8540	0.8968	0.5491	0.8442	0.7293	0.9056	0.4844	0.8940	0.8450	0.8971	0.9661	0.8816	0.9530	0.8352
148	0.7970	0.8354	0.2818	0.8784	0.8836	0.8940	0.8439	0.8818	0.5426	0.8418	0.7297	0.8038	0.4803	0.8845	0.8428	0.8805	0.9460	0.8718	0.9436	0.8314
149	0.7433	0.8318	0.2967	0.8296	0.8270	0.9098	0.9081	0.9808	0.4654	0.8998	0.8683	0.9463	0.4632	0.9546	0.9026	0.9667	0.9438	0.9810	0.9638	0.9918
150	0.7420	0.9098	0.2958	0.9154	0.8466	0.9411	0.9180	0.9506	0.4494	0.9101	0.8316	0.9681	0.4779	0.9579	0.9125	0.9718	0.9591	0.9561	0.9721	0.9333
151	0.8363	0.7532	0.2708	0.8306	0.8008	0.8471	0.7811	0.8256	0.4346	0.7488	0.6227	0.8698	0.3911	0.8156	0.7537	0.8292	0.8170	0.8098	0.8054	0.7369
152	0.8579	0.8936	0.2748	0.8248	0.7842	0.8891	0.8998	0.9108	0.3440	0.8879	0.7983	0.9419	0.4329	0.9146	0.8842	0.9227	0.9024	0.9208	0.9095	0.8796
153	0.6600	0.8553	0.2725	0.8138	0.8113	0.8638	0.8557	0.8898	0.3619	0.8610	0.7369	0.9290	0.3886	0.8914	0.8450	0.8956	0.9038	0.8848	0.9095	0.8424
154	0.5778	0.8346	0.2808	0.7987	0.7766	0.8348	0.8371	0.8814	0.3619	0.9320	0.7414	0.8918	0.3633	0.8505	0.8289	0.8457	0.8780	0.8524	0.8621	0.8238
155	0.8583	0.8879	0.2758	0.8346	0.8106	0.8614	0.8581	0.8936	0.3648	0.8464	0.7807	0.9279	0.3643	0.8972	0.8483	0.9036	0.9147	0.8862	0.9125	0.8381
156	0.8402	0.8175	0.2744	0.9001	0.8133	0.8370	0.7887	0.8757	0.4648	0.7737	0.7301	0.8983	0.3742	0.8621	0.7825	0.8672	0.9067	0.8397	0.9157	0.7668
157	0.8115	0.8727	0.2898	0.8084	0.7864	0.8631	0.8721	0.8922	0.3407	0.8677	0.7734	0.9271	0.4137	0.8927	0.8649	0.8848	0.8986	0.8910	0.9001	0.8400
158	0.7256	0.9636	0.2956	0.8181	0.8194	0.9426	0.9353	0.9700	0.4160	0.9297	0.8542	0.9784	0.5036	0.8682	0.8512	0.9597	0.9642	0.8831	0.9795	0.9236
159	0.8012	0.8424	0.2880	0.9096	0.7783	0.9002	0.8798	0.8949	0.5104	0.8158	0.8200	0.8448	0.6468	0.8498	0.8116	0.8557	0.8726	0.8652	0.8811	0.8018
160	0.7240	0.9588	0.2918	0.9189	0.7401	0.9248	0.9281	0.9718	0.3084	0.9217	0.9081	0.9552	0.5074	0.9529	0.9255	0.9638	0.9381	0.9516	0.9564	0.9163
AFM1	0.8186	0.8377	0.2823	0.8986	0.8081	0.9056	0.8898	0.8988	0.6152	0.8908	0.7437	0.9448	0.5303	0.8927	0.8606	0.8900	0.9481	0.8874	0.9675	0.8606
AFM2	0.4420	0.4751	0.1804	0.5707	0.4984	0.5381	0.5186	0.5494	0.3387	0.5183	0.4805	0.5370	0.4447	0.5612	0.5742	0.5153	0.5219	0.5821	0.5837	0.5029
AFM3	0.8260	0.9527	0.2977	0.9458	0.8204	0.9896	0.9279	0.9597	0.4596	0.9250	0.8781	0.9652	0.6101	0.9529	0.9250	0.9681	0.9757	0.9379	0.9778	0.9150
AFM4	0.8453	0.8017	0.2722	0.8671	0.8173	0.8531	0.8057	0.8586	0.4941	0.7983	0.7561	0.8658	0.4712	0.8568	0.8010	0.8543	0.8000	0.8460	0.8568	0.7847

INDEX	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
109	0.9777	0.9701	0.9626	0.9759	0.9751	0.9814	0.9385	0.9531	0.9484	0.9726	0.9840	0.9679	0.9665	0.9739	0.9720	0.9490	0.9444	0.9712	0.9648	0.9563
110	0.9878	0.9897	0.9728	0.9878	0.9856	0.9896	0.9897	0.9727	0.9877	0.9826	0.9870	0.9656	0.9634	0.9868	0.9819	0.9714	0.9672	0.9761	0.9708	0.9794
111	0.9633	0.9358	0.9217	0.9442	0.9548	0.9582	0.9218	0.9455	0.9307	0.9441	0.9582	0.9369	0.9731	0.9522	0.9552	0.9063	0.9346	0.9488	0.9361	0.9308
112	0.9487	0.9547	0.9754	0.9584	0.9750	0.9627	0.9778	0.9646	0.9966	0.9769	0.9663	0.9678	0.9808	0.9658	0.9724	0.9757	0.9799	0.9780	0.9804	0.9797
113	0.9268	0.9570	0.9633	0.9592	0.9722	0.9633	0.9714	0.9648	0.9588	0.9761	0.9577	0.9421	0.9720	0.9684	0.9646	0.9528	0.9724	0.9796	0.9830	0.9768
114	0.9750	0.9678	0.9671	0.9615	0.9641	0.9844	0.9838	0.9647	0.9866	0.9917	0.9845	0.9818	0.9883	0.9823	0.9840	0.9915	0.9793	0.9854	0.9906	0.9829
115	0.9781	0.9767	0.9524	0.9790	0.9896	0.9818	0.9450	0.9535	0.9429	0.9877	0.9728	0.9707	0.9888	0.9720	0.9856	0.9502	0.9388	0.9687	0.9567	0.9584
116	0.9732	0.9754	0.9783	0.9756	0.9786	0.9820	0.9878	0.9832	0.9827	0.9826	0.9779	0.9803	0.9798	0.9767	0.9829	0.9756	0.9848	0.9767	0.9818	0.9672
117	0.9736	0.9754	0.9581	0.9719	0.9840	0.9796	0.9647	0.9693	0.9646	0.9880	0.9877	0.9780	0.9783	0.9706	0.9700	0.9613	0.9426	0.9718	0.9730	0.9710
118	0.9578	0.9464	0.9279	0.9379	0.9313	0.9553	0.9630	0.9393	0.9089	0.9414	0.9426	0.9649	0.9656	0.9368	0.9438	0.9292	0.9364	0.9409	0.9416	0.9497
119	0.9555	0.9619	0.9606	0.9645	0.9634	0.9716	0.9828	0.9882	0.9917	0.9887	0.9750	0.9556	0.9620	0.9753	0.9788	0.9648	0.9793	0.9831	0.9866	0.9802
120	0.9851	0.9868	0.9468	0.9781	0.9648	0.9836	0.9469	0.9553	0.9482	0.9844	0.9726	0.9751	0.9793	0.9747	0.9714	0.9452	0.9380	0.9561	0.9597	0.9600
121	0.9570	0.9831	0.9808	0.9668	0.9800	0.9880	0.9568	0.9615	0.9808	0.9884	0.9887	0.9674	0.9620	0.9892	0.9886	0.9604	0.9556	0.9844	0.9822	0.9881
122	0.9371	0.9677	0.9493	0.9585	0.9508	0.9481	0.9375	0.9413	0.9480	0.9619	0.9819	0.9423	0.9210	0.9645	0.9421	0.9575	0.9332	0.9440	0.9404	0.9533
123	0.9096	0.9271	0.9162	0.9277	0.9199	0.9189	0.9148	0.9119	0.9157	0.9218	0.9192	0.9200	0.8965	0.9219	0.9133	0.9284	0.9100	0.9104	0.9109	0.9260
124	0.9410	0.9568	0.9432	0.9611	0.9491	0.9617	0.9398	0.9414	0.9436	0.9613	0.9480	0.9496	0.9271	0.9623	0.9426	0.9539	0.9308	0.9436	0.9428	0.9531
125	0.9816	0.9780	0.9678	0.9834	0.9750	0.9745	0.9578	0.9667	0.9677	0.9748	0.9764	0.9838	0.9496	0.9802	0.9670	0.9757	0.9630	0.9693	0.9648	0.9746
126	0.9783	0.9703	0.9631	0.9861	0.9877	0.9906	0.9578	0.8795	0.9722	0.9908	0.9897	0.9823	0.9796	0.9824	0.9864	0.9606	0.9634	0.9853	0.9772	0.9719
127	0.9587	0.9491	0.9613	0.9776	0.9745	0.9711	0.9487	0.9618	0.9816	0.9719	0.9750	0.9644	0.9523	0.9754	0.9584	0.9618	0.9490	0.9721	0.9622	0.9634
128	0.9058	0.9262	0.9125	0.9266	0.9182	0.9186	0.9056	0.9107	0.9137	0.9186	0.9157	0.9137	0.8948	0.9206	0.9079	0.9234	0.8946	0.9118	0.9103	0.9212
129	0.9563	0.9568	0.9488	0.9592	0.9557	0.9575	0.9389	0.9548	0.9501	0.9626	0.9882	0.9479	0.9511	0.9687	0.9631	0.9473	0.9418	0.9816	0.9537	0.9542
130	0.9620	0.9582	0.9468	0.9677	0.9629	0.9711	0.9488	0.9584	0.9645	0.9812	0.9656	0.9581	0.9597	0.9696	0.9656	0.9489	0.9462	0.9807	0.9590	0.9595
131	0.9621	0.9780	0.9623	0.9748	0.9908	0.9636	0.9677	0.9678	0.9818	0.9831	0.9583	0.9878	0.9572	0.9662	0.9622	0.9787	0.9428	0.9549	0.9668	0.9724
132	0.9647	0.9436	0.9248	0.9536	0.9518	0.9804	0.9162	0.9334	0.9279	0.9448	0.9640	0.9332	0.9532	0.9523	0.9518	0.9211	0.9181	0.9493	0.9326	0.9326
133	0.9221	0.9374	0.9251	0.9424	0.9327	0.9341	0.9203	0.9252	0.9267	0.9332	0.9329	0.9099	0.9116	0.9363	0.9250	0.9347	0.9152	0.9256	0.9233	0.9349
134	0.9299	0.9219	0.8955	0.9225	0.9151	0.9310	0.9028	0.9009	0.8952	0.9116	0.9244	0.9193	0.9287	0.9242	0.9171	0.8949	0.8836	0.9143	0.9032	0.9083
135	0.9387	0.9581	0.9382	0.9572	0.9446	0.9492	0.9303	0.9358	0.9389	0.9445	0.9492	0.9446	0.9263	0.9518	0.9378	0.9466	0.9208	0.9388	0.9360	0.9473
136	0.9581	0.9812	0.9527	0.9759	0.9729	0.9711	0.9374	0.9567	0.9536	0.9673	0.9768	0.9443	0.9494	0.9791	0.9682	0.9534	0.9430	0.9672	0.9588	0.9567
137	0.9503	0.9397	0.9263	0.9643	0.9564	0.9571	0.9088	0.9311	0.9225	0.9453	0.9629	0.9263	0.9436	0.9629	0.9533	0.9179	0.9182	0.9486	0.9308	0.9281
138	0.9626	0.9758	0.9624	0.9788	0.9677	0.9737	0.9540	0.9537	0.9649	0.9886	0.9898	0.9625	0.9628	0.9740	0.9649	0.9701	0.9392	0.9719	0.9679	0.9688
139	0.9539	0.9706	0.9677	0.9767	0.9773	0.9756	0.9646	0.9699	0.9694	0.9783	0.9772	0.9644	0.9564	0.9777	0.9747	0.9678	0.9670	0.9711	0.9681	0.9746
140	0.9352	0.9548	0.9378	0.9651	0.9418	0.9450	0.9263	0.9304	0.9340	0.9421	0.9446	0.9393	0.9181	0.9532	0.9336	0.9478	0.9182	0.9356	0.9305	0.9440
141	0.9672	0.9578	0.9438	0.9601	0.9515	0.9658	0.9449	0.9501	0.9477	0.9530	0.9563	0.9584	0.9531	0.9591	0.9581	0.9467	0.9298	0.9563	0.9562	0.9564
142	0.9816	0.9686	0.9618	0.9741	0.9734	0.9751	0.9493	0.9684	0.9800	0.9716	0.9756	0.9600	0.9826	0.9781	0.9725	0.9613	0.9526	0.9745	0.9653	0.9808
143	0.9289	0.9436	0.9161	0.9366	0.9220	0.9337	0.9128	0.9116	0.9129	0.9220	0.9272	0.9378	0.9128	0.9337	0.9183	0.9288	0.8970	0.9131	0.9112	0.9298
144	0.9183	0.9431	0.9362	0.9429	0.9333	0.9302	0.9301	0.9298	0.9347	0.9361	0.9308	0.9324	0.9049	0.9361	0.9242	0.9471	0.9230	0.9253	0.9271	0.9427
145	0.9417	0.9789	0.9761	0.9800	0.9709	0.9718	0.9758	0.9709	0.9759	0.9788	0.9686	0.9748	0.9504	0.9684	0.9672	0.9838	0.9686	0.9708	0.9737	0.9834
146	0.9398	0.9254	0.9146	0.8481	0.9483	0.9513	0.9048	0.9284	0.9220	0.9367	0.9566	0.9136	0.9393	0.9578	0.9466	0.9107	0.9143	0.9454	0.9174	0.9227
147	0.9458	0.9407	0.9094	0.9383	0.9304	0.9511	0.9100	0.9200	0.9138	0.9248	0.9416	0.9060	0.9481	0.9464	0.9330	0.9129	0.8962	0.9288	0.9206	0.9258
148	0.9426	0.9375	0.9044	0.9383	0.9261	0.9448	0.9010	0.9111	0.9043	0.9223	0.9356	0.9334	0.9364	0.9392	0.9263	0.9075	0.8886	0.9238	0.9134	0.9182
149	0.9811	0.9648	0.9670	0.9778	0.9800	0.9733	0.9598	0.9697	0.9678	0.9798	0.9791	0.9656	0.9581	0.9775	0.9767	0.9643	0.9697	0.9736	0.9686	0.9702
150	0.9674	0.9774	0.9696	0.9842	0.9798	0.9791	0.9623	0.9723	0.9728	0.9758	0.9813	0.9662	0.9621	0.9810	0.9744	0.9742	0.9608	0.9756	0.9712	0.9770
151	0.9166	0.8856	0.8375	0.8870	0.8839	0.9146	0.8377	0.9562	0.8448	0.8747	0.9037	0.8467	0.9129	0.9081	0.8849	0.8421	0.8379	0.8745	0.8562	0.8612
152	0.9031	0.9343	0.9268	0.9303	0.9171	0.9147	0.9237	0.9147	0.9226	0.9228	0.9131	0.9252	0.8833	0.9193	0.9068	0.9421	0.9108	0.9085	0.9142	0.9343
153	0.8958	0.9218	0.9026	0.9216	0.9048	0.9077	0.8954	0.9063	0.9009	0.9067	0.9060	0.9087	0.8778	0.9126	0.8929	0.9191	0.8839	0.8984	0.8940	0.9138
154	0.8609	0.8915	0.8757	0.8911	0.8732	0.8716	0.8647	0.8658	0.8719	0.8763	0.8892	0.8808	0.8385	0.8771	0.8598	0.8936	0.8562	0.8804	0.8634	0.8852
155	0.9096	0.9286	0.9108	0.9348	0.9193	0.9174	0.8963	0.9045	0.9075	0.9178	0.9207	0.9104	0.8846	0.9273	0.9089	0.9248	0.8927	0.9074	0.9022	0.9183
156	0.9038	0.8895	0.8892	0.9130	0.9105	0.9168	0.8481	0.8686	0.8790	0.9060	0.9263	0.8854	0.9088	0.9258	0.9083	0.8958	0.8587	0.9119	0.8854	0.9763
157	0.8809	0.9243	0.9105	0.9177	0.9022	0.9016	0.9027	0.8978	0.9041	0.9060	0.8982	0.9126	0.8707	0.9064	0.8908	0.9260	0.8874	0.8916	0.8942	0.9178
158	0.9569	0.9782	0.9723	0.9823	0.9743	0.9758	0.9458	0.9774	0.9798	0.9775	0.9732	0.9821	0.9542	0.9764	0.9716	0.9807	0.9568	0.9804	0.9792	0.9788
159	0.9175	0.9017	0.8880	0.8827	0.8958	0.9081	0.8881	0.8833	0.8818	0.8906	0.9150	0.9089	0.8922	0.8979	0.9028	0.8979	0.8947	0.8818	0.8785	0.8841
160	0.9370	0.9624	0.9714	0.9998	0.9864	0.9654	0.9588	0.9983	0.9703	0.9987	0.9819	0.9412	0.9318	0.9616	0.9803	0.9725	0.9466	0.9741	0.9701	0.9982
AFM1	0.9539	0.9402	0.9029	0.9418	0.9279	0.9552	0.9096	0.9223	0.9122	0.9268	0.9358	0.9424	0.9561	0.9384	0.9333	0.9092	0.8882	0.9367	0.9287	0.9217
AFM2	0.5668	0.5486	0.5316	0.5436	0.5741	0.5743	0.5736	0.5650	0.5436	0.5598	0.5843	0.5668	0.6411	0.5498	0.5778	0.5044	0.5887	0.5474	0.5481	0.5477
AFM3	0.9838	0.9813	0.9808	0.9819	0.9806	0.9861	0.9773	0.9754	0.9768	0.9827	0.9848	0.9854	0.9834	0.9800	0.9794	0.9781	0.9569	0.9831	0.9781	0.9826
AFM4	0.9070	0.8982	0.8728	0.9004	0.8958	0.9106	0.8647	0.8788	0.8730	0.8892	0.9080	0.8882	0.9066	0.9080	0.8960	0.8992	0.8572	0.8872	0.8801	0.8909

INDEX	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
55																				
56																				
57																				
58																				
59																				
60																				
61																				
62																				
63																				
64																				
65																				
66																				
67																				
68																				
69																				
70																				
71																				
72																				
73																				
74																				
75																				
76																				
77																				
78																				
79																				
80																				
81																				
82																				
82	0.9870																			
83	0.9716	0.9899																		
84	0.9853	0.9910	0.9857																	
85	0.9810	0.9878	0.9904	0.9838																
86	0.9928	0.9907	0.9818	0.9843	0.9912															
87	0.9733	0.9847	0.9915	0.9798	0.9811	0.9784														
88	0.9895	0.9837	0.9927	0.9861	0.9821	0.9840	0.9877													
89	0.9645	0.9829	0.9836	0.9860	0.9877	0.9808	0.9896	0.9958												
90	0.9827	0.9886	0.9918	0.9956	0.9957	0.9910	0.9888	0.9919	0.9913											
91	0.9879	0.9874	0.9903	0.9916	0.9942	0.9938	0.9771	0.9842	0.9815	0.9832										
92	0.9918	0.9919	0.9807	0.9840	0.9790	0.9870	0.9857	0.9741	0.9731	0.9832	0.9791									
93	0.9894	0.9902	0.9863	0.9761	0.9799	0.9894	0.9697	0.9744	0.9886	0.9773	0.9856	0.9824								
94	0.9854	0.9874	0.9849	0.9838	0.9849	0.9864	0.9747	0.9887	0.9825	0.9905	0.9846	0.9784	0.9825							
95	0.9867	0.9865	0.9890	0.9921	0.9859	0.9837	0.9839	0.9909	0.9857	0.9940	0.9836	0.9834	0.9838	0.9952						
96	0.9958	0.9880	0.9848	0.9862	0.9837	0.9791	0.9902	0.9898	0.9840	0.9903	0.9775	0.9787	0.9823	0.9808	0.9819					
97	0.9890	0.9716	0.9884	0.9743	0.9856	0.9734	0.9878	0.9848	0.9843	0.9863	0.9736	0.9716	0.9862	0.9744	0.9847	0.9787				
98	0.9784	0.9864	0.9892	0.9830	0.9833	0.9903	0.9819	0.9844	0.9825	0.9946	0.9913	0.9756	0.9778	0.9907	0.9914	0.9868	0.9787			
99	0.9728	0.9848	0.9927	0.9905	0.9909	0.9870	0.9883	0.9965	0.9950	0.9928	0.9831	0.9779	0.9720	0.9872	0.9917	0.9924	0.9756	0.9841		
100	0.9778	0.9916	0.9866	0.9904	0.9892	0.9877	0.9857	0.9834	0.9942	0.9941	0.9864	0.9868	0.9747	0.9865	0.9901	0.9954	0.9863	0.9906	0.9847	
101	0.9862	0.9861	0.9883	0.9937	0.9919	0.9933	0.9792	0.9836	0.9829	0.9919	0.9919	0.9883	0.9907	0.9924	0.9895	0.9866	0.9743	0.9879	0.9861	0.9898
102	0.9837	0.9877	0.9936	0.9850	0.9875	0.9844	0.9772	0.9787	0.9756	0.9872	0.9914	0.9808	0.9760	0.9858	0.9858	0.9771	0.9806	0.9783	0.9736	0.9848
103	0.9868	0.9526	0.9846	0.9590	0.9589	0.9758	0.9478	0.9582	0.9487	0.9563	0.9836	0.9694	0.9800	0.9855	0.9854	0.9345	0.9384	0.9548	0.9804	0.9641
104	0.9872	0.9843	0.9907	0.9883	0.9802	0.9796	0.9903	0.9867	0.9868	0.9833	0.9738	0.9805	0.9842	0.9778	0.9772	0.9872	0.9879	0.9821	0.9860	0.9879
105	0.9734	0.9873	0.9834	0.9881	0.9901	0.9876	0.9875	0.9837	0.9838	0.9919	0.9889	0.9795	0.9758	0.9832	0.9904	0.9906	0.9802	0.9947	0.9843	0.9945
106	0.9710	0.9748	0.9728	0.9781	0.9839	0.9806	0.9842	0.9908	0.9842	0.9834	0.9768	0.9754	0.9788	0.9786	0.9861	0.9743	0.9833	0.9824	0.9859	0.9853
107	0.9879	0.9918	0.9954	0.9889	0.9917	0.9836	0.9891	0.9843	0.9867	0.9922	0.9931	0.9891	0.9882	0.9913	0.9932	0.9643	0.9828	0.9894	0.9886	0.9934
108	0.9801	0.9885	0.9776	0.9906	0.9884	0.9878	0.9911	0.9782	0.9729	0.9846	0.9890	0.9740	0.9750	0.9892	0.9824	0.9740	0.9831	0.9847	0.9736	0.9784

INDEX	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
109	0.9796	0.9752	0.9438	0.9445	0.9660	0.9428	0.9656	0.9665												
110	0.9809	0.9659	0.9577	0.9789	0.9740	0.9701	0.9656	0.9664	0.9753											
111	0.9414	0.9401	0.9695	0.9319	0.9336	0.9562	0.9529	0.9482	0.9494	0.9528										
112	0.9627	0.9564	0.9441	0.9779	0.9786	0.9833	0.9701	0.9646	0.9223	0.9563	0.9537									
113	0.9812	0.9486	0.9129	0.9701	0.9775	0.9644	0.9801	0.9632	0.9222	0.9383	0.9875	0.9781								
114	0.9884	0.9837	0.9421	0.9843	0.9843	0.9736	0.9839	0.9815	0.9662	0.9789	0.9264	0.9717	0.9708							
115	0.9782	0.9823	0.9647	0.9584	0.9586	0.9606	0.9892	0.9822	0.9806	0.9772	0.9464	0.9237	0.9210	0.9611						
116	0.9788	0.9732	0.9648	0.9764	0.9816	0.9886	0.9580	0.9589	0.9406	0.9742	0.9462	0.9736	0.9588	0.9746	0.9483					
117	0.9700	0.9609	0.9616	0.9616	0.9715	0.9701	0.9736	0.9587	0.9416	0.9728	0.9440	0.9801	0.9527	0.9637	0.9586	0.9572				
118	0.9387	0.9286	0.9780	0.9481	0.9434	0.9586	0.9584	0.9207	0.9086	0.9474	0.9363	0.9386	0.9645	0.9361	0.9330	0.9656	0.9736			
119	0.9823	0.9764	0.9201	0.9824	0.9843	0.9584	0.9774	0.9732	0.9483	0.9687	0.9082	0.9786	0.9870	0.9804	0.9425	0.9702	0.9479	0.9114		
120	0.9706	0.9582	0.9788	0.9639	0.9656	0.9597	0.9686	0.9686	0.9704	0.9786	0.9802	0.9362	0.9086	0.9623	0.9736	0.9586	0.9790	0.9661	0.9355	
121	0.9686	0.9619	0.9359	0.9626	0.9646	0.9637	0.9680	0.9611	0.9487	0.9647	0.9262	0.9428	0.9401	0.9626	0.9482	0.9583	0.9456	0.9194	0.9575	0.9457
122	0.9582	0.9586	0.9806	0.9658	0.9472	0.9220	0.9478	0.9577	0.9578	0.9691	0.8786	0.9233	0.8248	0.9586	0.9326	0.9303	0.8244	0.8629	0.9578	0.8238
123	0.9279	0.9248	0.8703	0.9307	0.9180	0.9009	0.9202	0.9186	0.9084	0.9325	0.8568	0.9093	0.8930	0.9279	0.8993	0.9126	0.9006	0.8708	0.9262	0.9090
124	0.9573	0.9474	0.9086	0.9841	0.9442	0.9305	0.9482	0.9515	0.9327	0.9625	0.9023	0.9264	0.8218	0.9564	0.9374	0.9381	0.9390	0.9025	0.9520	0.9381
125	0.9807	0.9751	0.9275	0.9809	0.9707	0.9491	0.9721	0.9795	0.9620	0.9837	0.9153	0.9481	0.9449	0.9775	0.9574	0.9556	0.9548	0.9127	0.9756	0.9557
126	0.9773	0.9708	0.9799	0.9737	0.9774	0.9778	0.9813	0.9805	0.9779	0.9795	0.9781	0.9630	0.9464	0.9700	0.9706	0.9683	0.9736	0.9427	0.9581	0.9808
127	0.9730	0.9661	0.9325	0.9810	0.9859	0.9483	0.9662	0.9786	0.9692	0.9673	0.8289	0.9378	0.8428	0.9662	0.9606	0.9449	0.9436	0.9039	0.9601	0.9620
128	0.9287	0.9182	0.8766	0.9322	0.9147	0.8961	0.9163	0.9217	0.9001	0.9286	0.8577	0.8963	0.8908	0.9241	0.9048	0.9036	0.9090	0.8699	0.9221	0.9032
129	0.9841	0.9656	0.9412	0.9570	0.9648	0.9472	0.9802	0.9644	0.9604	0.9651	0.9374	0.9343	0.9275	0.9561	0.9549	0.9467	0.9482	0.9136	0.9462	0.9583
130	0.9816	0.9520	0.9614	0.9686	0.9580	0.9800	0.9656	0.9580	0.9481	0.9669	0.9464	0.9431	0.9236	0.9671	0.9609	0.9586	0.9582	0.9443	0.9426	0.9657
131	0.9755	0.9656	0.9159	0.9697	0.9601	0.9430	0.9640	0.9671	0.9379	0.9623	0.9066	0.9456	0.9367	0.9748	0.9479	0.9534	0.9588	0.9191	0.9740	0.9486
132	0.9486	0.9473	0.9436	0.9292	0.9403	0.9295	0.9496	0.9584	0.9698	0.9648	0.9428	0.9078	0.8911	0.9347	0.9537	0.9280	0.9375	0.9084	0.9159	0.9666
133	0.9396	0.9329	0.8934	0.9474	0.9275	0.9130	0.9321	0.9346	0.9160	0.9470	0.8914	0.9125	0.9040	0.9362	0.9175	0.9225	0.9210	0.8957	0.9352	0.9206
134	0.9230	0.9125	0.9175	0.9078	0.9070	0.9026	0.9204	0.9256	0.9270	0.9286	0.9086	0.8771	0.8574	0.9070	0.9303	0.9006	0.9200	0.8866	0.8851	0.9336
135	0.9569	0.9490	0.9039	0.9601	0.9394	0.9218	0.9447	0.9536	0.9360	0.9646	0.8909	0.9306	0.9087	0.9534	0.9384	0.9299	0.9371	0.8961	0.9477	0.9387
136	0.9700	0.9656	0.9334	0.9561	0.9613	0.9426	0.9523	0.9786	0.9755	0.9662	0.9318	0.9322	0.9313	0.9624	0.9567	0.9388	0.9406	0.8971	0.9539	0.9548
137	0.9493	0.9466	0.9310	0.9214	0.9376	0.9243	0.9446	0.9520	0.9713	0.9508	0.9386	0.8999	0.9031	0.9318	0.9521	0.9159	0.9225	0.8846	0.9147	0.9491
138	0.9756	0.9606	0.9420	0.9750	0.9662	0.9490	0.9585	0.9731	0.9606	0.9701	0.9200	0.9416	0.9410	0.9704	0.9622	0.9479	0.9667	0.9248	0.9526	0.9604
139	0.9746	0.9704	0.9445	0.9723	0.9716	0.9641	0.9784	0.9686	0.9661	0.9744	0.9350	0.9547	0.9466	0.9716	0.9527	0.9578	0.9640	0.9319	0.9656	0.9527
140	0.9546	0.9491	0.9322	0.9536	0.9382	0.9128	0.9410	0.9566	0.9372	0.9598	0.8789	0.9125	0.9066	0.9616	0.9381	0.9183	0.9276	0.8827	0.9486	0.9301
141	0.9574	0.9412	0.9581	0.9594	0.9546	0.9484	0.9564	0.9488	0.9384	0.9648	0.9257	0.9291	0.9173	0.9606	0.9507	0.9491	0.9648	0.9411	0.9344	0.9596
142	0.9641	0.9562	0.9612	0.9581	0.9653	0.9611	0.9596	0.9646	0.9652	0.9630	0.9564	0.9483	0.9409	0.9580	0.9586	0.9576	0.9629	0.9281	0.9480	0.9616
143	0.9414	0.9328	0.8931	0.9486	0.9186	0.9020	0.9292	0.9369	0.9156	0.9574	0.8737	0.9084	0.8781	0.9349	0.9242	0.9182	0.9315	0.8952	0.9248	0.9325
144	0.9422	0.9378	0.8796	0.9529	0.9317	0.9144	0.9330	0.9345	0.9083	0.9471	0.8643	0.9217	0.9146	0.9456	0.9084	0.9243	0.9173	0.8798	0.9481	0.9079
145	0.9791	0.9696	0.9284	0.9637	0.9731	0.9584	0.9745	0.9647	0.9441	0.9736	0.9062	0.9571	0.9606	0.9636	0.9512	0.9597	0.9563	0.9314	0.9610	0.9475
146	0.9368	0.9322	0.9414	0.9172	0.9368	0.9235	0.9396	0.9478	0.9581	0.9382	0.9380	0.9035	0.9008	0.9241	0.9376	0.9171	0.9229	0.8941	0.9095	0.9446
147	0.9410	0.9282	0.9479	0.9378	0.9276	0.9216	0.9406	0.9396	0.9386	0.9556	0.9299	0.9014	0.8982	0.9240	0.9428	0.9253	0.9540	0.9298	0.9026	0.9583
148	0.9386	0.9247	0.9318	0.9297	0.9182	0.9113	0.9313	0.9410	0.9407	0.9510	0.9204	0.8886	0.8940	0.9224	0.9483	0.9124	0.9410	0.9129	0.8997	0.9564
149	0.9720	0.9701	0.9374	0.9618	0.9696	0.9607	0.9723	0.9693	0.9526	0.9678	0.9347	0.9618	0.9525	0.9696	0.9496	0.9618	0.9408	0.9126	0.9581	0.9483
150	0.9617	0.9773	0.9409	0.9783	0.9733	0.9800	0.9783	0.9797	0.9681	0.9805	0.9341	0.9586	0.9501	0.9617	0.9606	0.9633	0.9586	0.9267	0.9762	0.9618
151	0.9386	0.9564	0.9186	0.9799	0.9618	0.9678	0.9667	0.9686	0.9673	0.9232	0.9251	0.8336	0.7682	0.9739	0.9223	0.9697	0.9080	0.8678	0.8364	0.9426
152	0.9311	0.9247	0.8567	0.9473	0.9201	0.8959	0.9201	0.9186	0.8634	0.9368	0.8301	0.9084	0.9045	0.9358	0.8928	0.9137	0.9042	0.8672	0.9410	0.8896
153	0.9205	0.9136	0.8538	0.9328	0.9018	0.8789	0.9061	0.9161	0.8908	0.9340	0.8372	0.8878	0.8756	0.9218	0.8947	0.8923	0.8979	0.8526	0.9218	0.8963
154	0.8897	0.8847	0.8088	0.9089	0.8876	0.8483	0.8716	0.8828	0.8512	0.9030	0.7847	0.8585	0.8526	0.8936	0.8586	0.8527	0.8613	0.8161	0.8978	0.8578
155	0.9007	0.9296	0.8581	0.9347	0.9096	0.8841	0.9114	0.9140	0.8142	0.9419	0.8482	0.8900	0.8843	0.9305	0.8964	0.8915	0.8982	0.8450	0.9288	0.8966
156	0.9225	0.9008	0.8035	0.8736	0.8960	0.8766	0.8564	0.9267	0.8493	0.9056	0.9183	0.8807	0.8483	0.8884	0.9128	0.8907	0.8870	0.8397	0.8984	0.9186
157	0.9204	0.9133	0.8384	0.9050	0.9028	0.8783	0.9043	0.9105	0.8748	0.9293	0.8173	0.8868	0.8424	0.8218	0.8849	0.8942	0.8835	0.8486	0.9263	0.8830
158	0.8789	0.9533	0.9439	0.9615	0.9776	0.9618	0.8726	0.8736	0.9658	0.9676	0.9232	0.9521	0.9624	0.9606	0.9554	0.9586	0.9656	0.9267	0.9773	0.9636
159	0.9007	0.9136	0.9013	0.8629	0.8943	0.8995	0.8036	0.8931	0.8980	0.9006	0.9105	0.8569	0.8302	0.8746	0.8982	0.9386	0.8788	0.9036	0.8856	0.8877
160	0.9627	0.9557	0.9276	0.9543	0.9711	0.9456	0.9486	0.9623	0.9458	0.9418	0.8931	0.9486	0.9595	0.9656	0.9347	0.9367	0.9275	0.8837	0.9721	0.9196
AFM1	0.9371	0.9133	0.8733	0.9367	0.9225	0.8916	0.9375	0.9390	0.8412	0.9467	0.9501	0.9016	0.8710	0.9201	0.9832	0.9225	0.9697	0.9428	0.8910	0.8756
AFM2	0.5491	0.5402	0.6334	0.5630	0.5307	0.5304	0.5466	0.5302	0.5379	0.5604	0.6993	0.5493	0.5030	0.5126	0.5820	0.6352	0.5742	0.6435	0.5008	0.5666
AFM3	0.9487	0.9630	0.9456	0.9685	0.9817	0.9583	0.9660	0.9634	0.9727	0.9791	0.9440	0.9637	0.9475	0.9764	0.9794	0.9735	0.9648	0.9477	0.9679	0.9637
AFM4	0.9015	0.8928	0.8987	0.8770	0.8990	0.8756	0.8997	0.9093	0.9186	0.9035	0.8990	0.8490	0.8336	0.8801	0.9140	0.8730	0.8925	0.8674	0.8595	0.9083

INDEX	101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
55																				
56																				
57																				
58																				
59																				
60																				
61																				
62																				
63																				
64																				
65																				
66																				
67																				
68																				
69																				
70																				
71																				
72																				
73																				
74																				
75																				
76																				
77																				
78																				
79																				
80																				
81																				
82																				
82																				
83																				
84																				
85																				
86																				
87																				
88																				
89																				
90																				
91																				
92																				
93																				
94																				
95																				
96																				
97																				
98																				
99																				
100																				
101																				
102	0.9896																			
103	0.9539	0.9383																		
104	0.9828	0.9677	0.9643																	
105	0.9880	0.9706	0.9800	0.9816																
106	0.9736	0.9693	0.9696	0.9778	0.9814															
107	0.9826	0.9687	0.9670	0.9810	0.9916	0.9847														
108	0.9811	0.9648	0.9480	0.9702	0.9782	0.9634	0.9820													

INDEX	121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
109																				
110																				
111																				
112																				
113																				
114																				
115																				
116																				
117																				
118																				
119																				
120																				
121																				
122	0.9580																			
123	0.9304	0.9482																		
124	0.9678	0.9729	0.9459																	
125	0.9830	0.9899	0.9686	0.9861																
126	0.9867	0.9866	0.9283	0.9828	0.9918															
127	0.9714	0.9856	0.9280	0.9806	0.9901	0.9932														
128	0.9243	0.9443	0.9185	0.9434	0.9857	0.9287	0.9278													
129	0.9695	0.9536	0.9220	0.9546	0.9808	0.9948	0.9739	0.9210												
130	0.9878	0.9488	0.9242	0.9574	0.9794	0.9899	0.9872	0.9232	0.9707											
131	0.9733	0.9959	0.9783	0.9998	0.9990	0.9708	0.9737	0.9748	0.9855	0.9725										
132	0.9618	0.9351	0.8990	0.9323	0.9851	0.9947	0.9984	0.9311	0.9851	0.9842	0.9396									
133	0.9432	0.9802	0.9346	0.9816	0.9838	0.9500	0.9444	0.9311	0.9405	0.9433	0.9908	0.9198								
134	0.9167	0.8998	0.8702	0.9053	0.9276	0.8482	0.9284	0.8739	0.9254	0.9295	0.9184	0.9331	0.8991							
135	0.9552	0.9779	0.9496	0.9772	0.9990	0.9622	0.9598	0.9483	0.9541	0.9562	0.9990	0.9366	0.9552	0.9081						
136	0.9734	0.9894	0.9318	0.9823	0.9956	0.9990	0.9989	0.9308	0.9811	0.9737	0.9743	0.9809	0.9491	0.9297	0.9854					
137	0.9618	0.9334	0.8948	0.9277	0.9823	0.9933	0.9719	0.9946	0.9858	0.9586	0.9302	0.9805	0.9138	0.9281	0.9308	0.9863				
138	0.9886	0.9885	0.9333	0.9877	0.9930	0.9878	0.9801	0.9387	0.9702	0.9727	0.9882	0.9623	0.9805	0.9300	0.9894	0.9818	0.9677			
139	0.9809	0.9706	0.9435	0.9896	0.9958	0.9981	0.9805	0.9362	0.9789	0.9804	0.9867	0.9832	0.9660	0.9243	0.9878	0.9844	0.9811	0.9779		
140	0.9520	0.9821	0.8488	0.9756	0.9990	0.9570	0.9827	0.9479	0.9610	0.9483	0.9990	0.9363	0.9629	0.9048	0.9636	0.9985	0.9338	0.9706	0.9677	
141	0.9647	0.9336	0.9074	0.9428	0.9828	0.9798	0.9550	0.9111	0.9580	0.9670	0.9584	0.9478	0.9249	0.9231	0.9408	0.9563	0.9398	0.9678	0.9867	0.9360
142	0.9718	0.9431	0.9139	0.9491	0.9767	0.9990	0.9799	0.9123	0.9774	0.9791	0.9531	0.9741	0.9335	0.9312	0.9430	0.9839	0.9737	0.9708	0.9836	0.9366
143	0.9383	0.9706	0.9487	0.9740	0.9836	0.9419	0.9402	0.9480	0.9382	0.9467	0.9990	0.9222	0.9432	0.9006	0.9642	0.9467	0.9108	0.9671	0.9656	0.9621
144	0.9448	0.9727	0.9472	0.9696	0.9916	0.9404	0.9437	0.9406	0.9348	0.9388	0.9990	0.9070	0.9565	0.8788	0.9736	0.9454	0.9007	0.9620	0.9611	0.9733
145	0.9758	0.9764	0.9508	0.9774	0.9965	0.9731	0.9730	0.9446	0.9846	0.9870	0.9990	0.9361	0.9602	0.9133	0.9736	0.9889	0.9312	0.9801	0.9880	0.9704
146	0.9464	0.9238	0.9073	0.9214	0.9568	0.9970	0.9640	0.8882	0.9612	0.9800	0.9222	0.9739	0.9094	0.9200	0.9220	0.9805	0.9804	0.9811	0.9813	0.9248
147	0.9401	0.9314	0.9080	0.9407	0.9843	0.9756	0.9440	0.9131	0.9489	0.9537	0.9619	0.9543	0.9289	0.9287	0.9488	0.9547	0.9446	0.9674	0.9548	0.9432
148	0.9327	0.8253	0.8877	0.9347	0.9562	0.9640	0.9418	0.8040	0.9451	0.9502	0.9522	0.9494	0.9196	0.9248	0.9408	0.9490	0.9419	0.9517	0.9446	0.9383
149	0.9788	0.9826	0.9323	0.9693	0.9874	0.9981	0.9828	0.9238	0.9772	0.9723	0.9984	0.9643	0.9448	0.9196	0.9648	0.9877	0.9885	0.9714	0.9923	0.9531
150	0.9821	0.9806	0.9486	0.9773	0.9990	0.9990	0.9872	0.9487	0.9823	0.9818	0.9975	0.9700	0.9640	0.9317	0.9800	0.9831	0.9953	0.9896	0.9981	0.9790
151	0.9981	0.9844	0.9801	0.9990	0.9214	0.9534	0.9084	0.8678	0.9249	0.9354	0.9102	0.9484	0.8900	0.9148	0.9118	0.9314	0.9378	0.9139	0.9127	0.9057
152	0.9321	0.9730	0.9408	0.9598	0.9868	0.9143	0.9280	0.9415	0.9167	0.9221	0.9990	0.9812	0.9584	0.8598	0.9738	0.9264	0.8731	0.9407	0.9469	0.9743
153	0.9224	0.9886	0.9437	0.9877	0.9989	0.9170	0.9256	0.9407	0.9178	0.9200	0.9990	0.9825	0.9582	0.8871	0.9770	0.9512	0.8638	0.9376	0.9308	0.9783
154	0.9911	0.9437	0.9217	0.9427	0.9800	0.8753	0.8913	0.9152	0.8825	0.8838	0.8874	0.8488	0.9333	0.8298	0.9508	0.8841	0.8408	0.9036	0.8078	0.9613
155	0.9327	0.9774	0.9453	0.9997	0.9965	0.9344	0.9438	0.9422	0.9336	0.9284	0.9990	0.9150	0.9808	0.8782	0.9808	0.9581	0.9138	0.8496	0.9492	0.9861
156	0.9074	0.8916	0.8454	0.9825	0.9248	0.9722	0.8366	0.8559	0.8347	0.9243	0.8828	0.9688	0.8734	0.9014	0.8923	0.9540	0.9714	0.9272	0.9196	0.8964
157	0.9178	0.9868	0.9420	0.9827	0.9814	0.8993	0.9160	0.9388	0.9067	0.9083	0.9990	0.8708	0.9520	0.9525	0.9708	0.9161	0.9538	0.9018	0.9337	0.9713
158	0.9738	0.9887	0.9367	0.9878	0.9933	0.9929	0.9807	0.9380	0.8719	0.8756	0.9883	0.9870	0.9613	0.9221	0.9671	0.9817	0.9518	0.9907	0.9872	0.9884
159	0.9012	0.8586	0.8368	0.8536	0.8828	0.8207	0.8966	0.8244	0.8918	0.9008	0.8807	0.9163	0.8430	0.8825	0.8536	0.8906	0.9029	0.8851	0.9122	0.8512
160	0.9586	0.8521	0.9120	0.8410	0.8716	0.9866	0.8731	0.9115	0.9610	0.9408	0.9582	0.9380	0.9220	0.8870	0.9056	0.9879	0.9414	0.9898	0.9857	0.9418
AFM1	0.9139	0.8834	0.8580	0.9058	0.9199	0.9609	0.8234	0.8744	0.9311	0.8457	0.9188	0.9367	0.8870	0.8243	0.9056	0.9233	0.9258	0.9414	0.8232	0.8966
AFM2	0.5604	0.4644	0.4788	0.4886	0.4997	0.5600	0.5237	0.4569	0.5566	0.5810	0.4889	0.5602	0.4918	0.5817	0.4813	0.5048	0.5438	0.4997	0.5582	0.4490
AFM3	0.9588	0.9433	0.9104	0.9364	0.9647	0.9707	0.9667	0.9106	0.9539	0.9539	0.9584	0.9526	0.9214	0.9259	0.9367	0.9575	0.9456	0.9698	0.9582	0.9393
AFM4	0.9956	0.8779	0.8433	0.8776	0.9066	0.8537	0.9134	0.8488	0.9082	0.9077	0.8867	0.9290	0.8627	0.8808	0.8819	0.9199	0.9246	0.9124	0.9084	0.8846

INDEX	141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160	AFM1	AFM2	AFM3
109																							
110																							
111																							
112																							
113																							
114																							
115																							
116																							
117																							
118																							
119																							
120																							
121																							
122																							
123																							
124																							
125																							
126																							
127																							
128																							
129																							
130																							
131																							
132																							
133																							
134																							
135																							
136																							
137																							
138																							
139																							
140																							
141																							
142	0.9829																						
143	0.9301	0.9212																					
144	0.9200	0.9243	0.9724																				
145	0.9605	0.9638	0.9817	0.9702																			
146	0.9378	0.9773	0.9025	0.8943	0.9228																		
147	0.9514	0.9507	0.9512	0.9198	0.9398	0.9481																	
148	0.9417	0.9430	0.9404	0.9090	0.9336	0.9337	0.9677																
149	0.9542	0.9661	0.9329	0.9448	0.9780	0.9645	0.9374	0.9327															
150	0.9570	0.9621	0.9648	0.9664	0.9813	0.9610	0.9568	0.9531	0.9803														
151	0.9128	0.9243	0.9173	0.8988	0.8799	0.9380	0.9589	0.9477	0.9698	0.9231													
152	0.9066	0.9008	0.9783	0.9817	0.9675	0.9663	0.9044	0.9932	0.9276	0.9529	0.8404												
153	0.9003	0.9006	0.9882	0.9750	0.9511	0.8782	0.9189	0.9077	0.9167	0.9500	0.8784	0.9873											
154	0.9636	0.9597	0.9812	0.9648	0.9270	0.8298	0.8781	0.9569	0.9659	0.9190	0.8294	0.9726	0.9741										
155	0.9067	0.9144	0.9834	0.9737	0.9526	0.9034	0.9229	0.9170	0.9352	0.9532	0.8897	0.9796	0.9885	0.9877									
156	0.9023	0.8477	0.8998	0.8526	0.8757	0.9754	0.9253	0.8169	0.9278	0.9336	0.9388	0.8140	0.8438	0.7903	0.8607								
157	0.8836	0.8836	0.9799	0.9746	0.9648	0.9512	0.9004	0.8819	0.9108	0.9427	0.8417	0.9819	0.9878	0.9741	0.9907	0.9078							
158	0.9877	0.9765	0.9488	0.9564	0.9875	0.9497	0.9491	0.9408	0.9798	0.9846	0.8960	0.9436	0.9348	0.9015	0.9446	0.9208	0.9301						
159	0.8647	0.9089	0.8417	0.8334	0.8886	0.8952	0.8928	0.8805	0.9051	0.9008	0.8633	0.9098	0.7974	0.7552	0.8047	0.8586	0.7911	0.8812					
160	0.9386	0.9818	0.9086	0.9284	0.9497	0.9323	0.9045	0.9045	0.9719	0.9739	0.8390	0.9149	0.9001	0.8689	0.9171	0.9066	0.8998	0.9795	0.8779				
AFM1	0.9466	0.9403	0.9033	0.8879	0.9116	0.8246	0.9529	0.8482	0.9102	0.9296	0.9453	0.8456	0.8586	0.8140	0.8631	0.9074	0.8395	0.9314	0.8766	0.8872			
AFM2	0.5533	0.5836	0.4791	0.4587	0.5246	0.5401	0.5652	0.5618	0.5614	0.5279	0.6869	0.4255	0.4214	0.4008	0.4092	0.4911	0.4118	0.4830	0.6758	0.4637	0.4204		
AFM3	0.9662	0.9801	0.9231	0.9218	0.9664	0.9333	0.9382	0.9368	0.9814	0.9713	0.8911	0.9059	0.8958	0.8598	0.9032	0.9029	0.8941	0.9691	0.9370	0.9508	0.9951	0.7824	
AFM4	0.8013	0.9164	0.8713	0.8490	0.8831	0.9202	0.9124	0.9058	0.9019	0.9112	0.9018	0.8252	0.8381	0.7925	0.8648	0.9115	0.8191	0.9023	0.8763	0.8837	0.8861	0.4868	0.9120

APPENDIX F

STATISTICAL RESULTS

STATISTICAL MEASURES RESULTING BY APPLYING THE FIRST STANDARD ON THE GROUP OF COMPANIES PARTICIPATING IN THE STUDY

COMPANY NUMBER	REGRESSION LINEAR EQUATION COEFFICIENTS B0	B1	CORRELATION R	COEFFICIENT OF DETERMINATION R2
1	-70.74425	48.27712	0.98282	0.96593
2	2.45700	0.01679	0.12785	0.01635
3	19.53489	1.74207	0.30533	0.09323
4	21.36376	-1.22342	-0.48726	0.23742
5	0.62029	0.19497	0.74497	0.55496
6	1.13716	0.14646	0.65055	0.42322
7	2.04022	-0.11841	-0.59684	0.35662
8	1.03588	0.28102	0.79468	0.63151
9	0.84618	0.26360	0.73172	0.53542
10	-1.10851	0.66299	0.85916	0.73815
11	0.30692	0.14777	0.73263	0.53675
12	0.36792	0.16259	0.61108	0.37342
13	-0.16439	0.46143	0.82126	0.67447
14	-1.47934	0.55449	0.94909	0.90077
15	-0.60741	0.28732	0.91347	0.83442
16	-0.15828	0.15429	0.85843	0.73690
17	-1.04545	0.73577	0.89673	0.80412
18	0.57171	0.02321	0.17189	0.02948
19	35.43642	-5.93165	-0.80979	0.65578
20	0.88451	0.10787	0.60996	0.37205
21	11.44273	-1.54507	-0.68814	0.47354
22	-0.05742	0.20738	0.43655	0.19057
23	-0.10682	0.30006	0.92942	0.86362
24	0.18456	0.19084	0.87114	0.75888
25	-0.80902	0.40730	0.92530	0.85619
26	-0.21221	0.27810	0.77291	0.59739
27	0.60252	0.17479	0.78783	0.62067
28	1.67365	-0.03273	-0.21369	0.04567
29	0.61274	-0.03905	-0.22591	0.05103
30	-1.60024	0.55061	0.91215	0.83201
31	0.75827	-0.00483	-0.07928	0.00629
32	-1.73631	0.65309	0.87520	0.76597
33	0.40915	-0.05301	-0.78408	0.61478
34	2.40623	-0.20610	-0.34621	0.11986
35	0.09702	0.05464	0.76972	0.59246
36	0.83478	0.00678	0.14210	0.02019
37	0.78058	0.01133	0.12187	0.01485
38	3.19161	-0.03752	-0.06912	0.00478
39	0.09630	0.15277	0.65825	0.43329
40	0.26627	0.10220	0.69538	0.48355
41	-1.46172	3.85087	0.76998	0.59287
42	1.06593	0.00295	0.01544	0.00024
43	-2.23075	1.20909	0.91076	0.82948
44	5.41149	0.50399	0.61692	0.38059
45	1.79479	0.04336	0.21968	0.04825
46	-0.08141	0.19418	0.74429	0.55397
47	-0.35551	0.43564	0.82238	0.67631
48	-3.91035	1.52191	0.96200	0.92545
49	2.99794	0.39468	0.70121	0.49169
50	-5.35879	3.44530	0.31469	0.09903
51	0.62256	0.10968	0.49047	0.24056
52	-4.24324	1.78032	0.93049	0.86582
53	0.27151	0.31782	0.70981	0.50384
54	-2.19795	0.76834	0.88996	0.79203
55	-2.52059	0.95022	0.95854	0.91881
56	0.05445	0.20598	0.60014	0.36017
57	2.28768	0.57357	0.55202	0.30472
58	-3.23612	1.20357	0.96873	0.93843
59	0.45071	-0.05497	-0.64695	0.41855
60	0.24793	0.38226	0.84275	0.71022
61	0.02633	0.07377	0.73329	0.53771
62	2.19651	0.09737	0.21125	0.04463
63	-0.42022	0.24309	0.71644	0.51329
64	-2.28479	0.87382	0.93858	0.88089
65	-1.68958	0.79740	0.81873	0.67032
66	-2.58903	0.80204	0.92600	0.86119
67	-5.28245	1.69779	0.92898	0.86297
68	-3.18534	1.09818	0.95433	0.91075
69	-1.35804	0.49302	0.91316	0.83387
70	-3.87962	1.25667	0.95807	0.91789
71	-5.02551	1.51818	0.92810	0.86137
72	3.82750	-0.25408	-0.35651	0.12710
73	-2.46485	0.81095	0.90183	0.81330

STATISICAL MEASURES RESULTING BY APPLYING
THE SECOND STANDARD
ON THE INDEXES DEVELOPED BY THE STUDY

INDEX TRIALS	REGRESSION LINEAR EQUATION COEFFICIENTS B0	B1	CORRELATION R	COEFFICIENT OF DETERMINATION R2
APPROACH 1				
1	-3.82311	1.05898	0.99568	0.99178
2	-11.10633	2.07751	0.99608	0.99213
3	6.41781	0.20863	0.96857	0.93813
4	-1.79042	1.39518	0.96710	0.93529
5	-18.57891	2.35032	0.99480	0.98962
6	-13.36958	1.41030	0.96883	0.97778
7	-16.24826	3.01571	0.99429	0.98861
8	-16.43921	1.90489	0.97410	0.94887
9	18.81117	0.56238	0.93872	0.88120
10	10.57408	0.20152	0.88290	0.77961
11	0.63951	0.78507	0.98859	0.97732
12	5.19932	0.42931	0.96276	0.92690
13	-2.83206	1.41174	0.98040	0.96118
14	-2.04487	0.97113	0.99666	0.99332
15	-4.23755	2.74925	0.97910	0.95864
16	8.51042	0.21001	0.91134	0.83054
17	-3.52642	1.04474	0.99720	0.99441
18	-4.97867	1.03174	0.99741	0.99482
19	33.30739	1.29866	0.93924	0.88217
20	-16.54804	2.34060	0.99696	0.99393
21	11.52225	0.67161	0.88383	0.78115
22	-24.78439	3.31976	0.99443	0.98888
23	6.20663	0.19377	0.92251	0.85103
24	9.39734	0.89518	0.92819	0.86154
25	-9.53945	1.30305	0.96958	0.94010
26	-8.77322	1.03063	0.99574	0.99349
27	6.92336	0.20188	0.88392	0.78132
28	10.09663	0.64770	0.97643	0.95146
29	28.83279	0.56848	0.93097	0.86671
30	-3.07646	1.02047	0.99454	0.98910
31	2.16668	0.40796	0.91282	0.83325
32	1.36348	2.25496	0.91343	0.83435
33	11.14246	0.62505	0.97583	0.95225
34	-19.11105	1.88947	0.97801	0.95651
35	-54.34350	4.80383	0.97465	0.94994
36	48.34429	1.10838	0.93708	0.87812
37	-21.62248	1.57325	0.96239	0.92619
38	-41.11401	2.20999	0.96245	0.92631
39	-19.92818	2.66638	0.97503	0.95068
40	13.56255	0.33058	0.92927	0.86354
APPROACH 2				
41	-2.62461	2.46182	0.99398	0.98797
42	-0.36509	0.46400	0.96503	0.93129
43	0.37742	0.49723	0.91163	0.83107
44	0.37404	0.35447	0.95532	0.91264
45	0.05262	2.13862	0.99417	0.98838
46	1.66804	0.19998	0.63697	0.40573
47	1.05988	0.48182	0.86351	0.74564
48	1.24298	0.37202	0.83780	0.70158
49	-1.58752	2.44209	0.99625	0.99251
50	2.71549	0.23219	0.70172	0.49241
51	0.04267	1.69998	0.99190	0.98387
52	2.98704	0.18365	0.59155	0.34993
53	0.95012	0.28655	0.94103	0.88553
54	1.96680	0.19850	0.75622	0.57187
55	-2.62673	2.02149	0.99522	0.99046
56	-0.92877	1.86346	0.99272	0.98549
57	-0.56213	1.57027	0.99004	0.98019
58	-1.20995	1.89219	0.99322	0.98648
59	-0.85746	1.85046	0.99337	0.98678
60	2.43932	0.03499	0.20363	0.04146
61	1.09313	0.16819	0.68030	0.46261
62	-0.12776	0.36213	0.98224	0.82590
63	-0.47536	0.49735	0.99095	0.92342
64	0.59030	0.33737	0.90009	0.81016
65	1.35832	0.57127	0.80446	0.64716
66	0.53101	0.44526	0.97021	0.94130
67	-4.36342	3.10270	0.99019	0.98048
68	-0.21844	0.33405	0.98106	0.92364
69	4.08173	0.22023	0.47471	0.22536
70	-3.43012	3.17312	0.98804	0.97623
71	0.63391	0.25785	0.88241	0.77865
72	-0.65008	0.52715	0.97569	0.95198
73	2.53411	0.15680	0.58626	0.34370
74	-0.37871	0.38062	0.97039	0.94165
75	-7.34604	5.28426	0.98831	0.97678
76	-1.16882	0.56974	0.96127	0.92404
77	-0.08157	0.45703	0.95409	0.91028
78	-0.78490	0.43565	0.96515	0.93152
79	-0.80256	0.58121	0.96788	0.93643
80	-7.15856	5.09949	0.98502	0.97025

STATISICAL MEASURES RESULTING BY APPLYING
THE SECOND STANDARD
ON THE INDEXES DEVELOPED BY THE STUDY (Cont.)

INDEX TRIALS	REGRESSION LINEAR EQUATION COEFFICIENTS B0	B1	CORRELATION R	COEFFICIENT OF DETERMINATION R2
APPROACH 3				
81	-40.55797	0.49722	0.99025	0.98059
82	-31.20782	0.66003	0.99377	0.98758
83	-29.27358	0.65275	0.98736	0.97489
84	-21.26620	0.87311	0.99666	0.99332
85	-31.20223	0.75936	0.99546	0.99093
86	-32.20833	0.69579	0.99736	0.99477
87	-18.89900	0.80095	0.98319	0.96667
88	-41.13106	0.75777	0.99057	0.98123
89	-35.55290	0.72099	0.98677	0.97372
90	-41.65273	0.58368	0.99484	0.98970
91	-36.82372	0.73095	0.99552	0.99106
92	-45.84681	0.47190	0.98793	0.97600
93	-36.29902	0.47924	0.98821	0.97657
94	-39.11714	0.93544	0.99579	0.99160
95	-36.58249	0.77746	0.99529	0.99060
96	-23.92305	1.12273	0.98474	0.96972
97	-44.76866	0.46823	0.97807	0.95662
98	-36.64641	0.77486	0.99453	0.98908
99	-2.72675	1.37105	0.99089	0.98187
100	-27.83094	1.00832	0.99176	0.98357
101	-41.80148	0.73118	0.99492	0.98986
102	-40.80178	0.48480	0.98748	0.97513
103	-31.34875	0.57511	0.97196	0.94474
104	-58.23960	0.59254	0.98677	0.97372
105	-44.79738	0.83985	0.99128	0.98264
106	-23.82213	0.47987	0.98490	0.97002
107	-30.33687	0.78141	0.99538	0.99077
108	-50.25229	0.42458	0.99014	0.98038
109	-29.89977	0.78158	0.97911	0.95896
110	-18.73078	0.91800	0.99117	0.98242
111	-23.80433	0.44559	0.95949	0.92063
112	-58.23482	0.50951	0.97309	0.94691
113	-53.51897	0.91635	0.98368	0.92868
114	-31.38203	0.93790	0.98783	0.97580
115	-36.48303	0.42581	0.97862	0.95769
116	-38.84214	0.73143	0.98224	0.96479
117	-42.13052	0.81629	0.98076	0.96189
118	-44.29362	0.41427	0.95274	0.90771
119	-39.80997	1.02633	0.97975	0.95991
120	-19.52523	0.80714	0.98116	0.96268
APPROACH 4				
121	-0.00004	2.47215	0.99150	0.98307
122	-0.00019	2.22038	0.98985	0.97981
123	-0.00019	1.78275	0.98798	0.97611
124	-0.00045	1.84207	0.99360	0.98725
125	-0.00004	2.27983	0.99570	0.99142
126	0.00032	1.95279	0.98101	0.96236
127	0.00009	1.84848	0.99170	0.98347
128	-0.00027	2.15054	0.99261	0.98527
129	0.00003	2.98547	0.99349	0.98703
130	-0.00004	2.35393	0.98858	0.97725
131	-0.00041	1.70364	0.99294	0.98617
132	0.00164	4.49255	0.97795	0.95639
133	-0.00033	3.04848	0.99260	0.98525
134	0.00015	1.75389	0.98136	0.96311
135	-0.00025	3.29682	0.99253	0.98512
136	0.00106	5.57879	0.99022	0.98054
137	0.00083	2.44596	0.97209	0.94497
138	-0.00014	3.71208	0.99318	0.98641
139	0.00029	2.95920	0.99105	0.98211
140	-0.00002	2.06331	0.98984	0.97968
141	-0.00036	4.27008	0.98370	0.96767
142	0.00059	7.38445	0.98006	0.96051
143	-0.00040	3.90663	0.97848	0.95743
144	-0.00056	3.19589	0.98073	0.96183
145	-0.00159	6.35302	0.98375	0.96777
146	0.00191	5.32787	0.96597	0.93310
147	0.00049	2.99937	0.97998	0.96013
148	0.00041	3.39365	0.98353	0.96733
149	0.00019	5.61071	0.98414	0.96853
150	0.00019	6.41337	0.99526	0.99051
151	0.00019	6.55500	0.93455	0.87338
152	-0.00237	5.99300	0.95965	0.92093
153	-0.00072	4.25087	0.96458	0.93036
154	-0.00109	3.05832	0.94694	0.89669
155	-0.00080	7.71874	0.97291	0.94658
156	0.00694	14.07218	0.93508	0.87433
157	-0.00259	6.95878	0.95539	0.91277
158	-0.00098	10.15300	0.98769	0.97553
159	0.00334	2.93708	0.89436	0.79991
160	-0.00017	8.68527	0.96483	0.93089